# Appendices

# Water Storage Task Force

## Report to the Legislature

February 2001

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Publication No. 01-11-002a

# Water Storage Task Force

## Report to the Legislature

## Appendices

Prepared by
Water Resources Program
Washington State Department of Ecology
under the direction of
The Water Storage Task Force

*Cover photo: Judy Reservoir, Skagit County*

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# Appendix A.
# Presentations to the Water Storage Task Force

# Why Store Water?

Water Storage Task Force
August 1, 2000
by Keith Phillips, Water Resources Program Manager
Washington Department of Ecology

**The numbers ~ population growth**

- surface code adopted (1917)
- last time code updated (1971)
- today
- 7.0 M -- by 2010
- Eastern ≠ Western Washington:
  -economics, total population, and water supply are not similar
  -growth rates are similar

**The numbers ~ endangered fish**

- 16 listed salmon/trout/steelhead runs
- 12 candidate runs
- 16 over-appropriated basins: instream flows critical to recovery
- 10 salmon recovery areas – most of the state (all but 1 county)

**The numbers ~ water rights**

- 7,000 water right applications (including 1600 changes)
- 8,000 new "exempt" water supply wells drilled each year
- 10,000 certificates for public water supply questioned by case law
- 170,000 unadjudicated water right claims (2/3 of the rights in the state)

**Rain and snow affect supplies**
**Urbanizing land use ~ changes hydrology**
**The water challenge ~**

- Foster rural economic development
- Manage population growth
- Restore salmon runs

**If you don't have enough …**
**… you have to "make water" ~**

- Water use efficiencies
- Water conservation
- Water re-use
- Move water -- share resources, distribute water to where needed
- Store water -- for when and/or where needed

**A person's right to ...**

- Build a dam across state river beds RCW 90.28.170
- Store water for mining/manufacturing RCW 90.16.020
- Store water by condemning inferior use RCW 90.03.040

**State role**

- Plans to control/develop water resources for supply/flood control
- Funding for water supply facilities
- Permits for reservoirs, secondary use of reservoir water, dam safety
- Fees for permits and hydropower
- Rules allowing claims of artificially stored ground waters
- Reservoir permits for underground aquifer storage/recovery projects

**Fish protections**

- New storage projects ...
- consider flows adequate to support food fish and game fish populations (RCW 75.20.050)
- "Full recognition" to established in-stream flow rights ( RCW 90.22.010)
- "Due regard shall be given to means and methods for protection of fishery resources in the planning for and construction of water impoundment structures and other artificial obstructions." RCW 90.54.020

**"It is the policy of the state to promote the use of the public waters in a fashion which provides for obtaining maximum net benefits arising from both the diversionary uses of the state's public waters and the retention of waters within the streams and lakes in sufficient quantity and quality to protect instream and natural values and rights. Consistent with this policy, the state supports economically feasible and environmentally sound development of physical facilities…" RCW 90.03.005**

**Water "fundamentals"**

- The development of multipurpose water storage facilities shall be a high priority for programs of water allocation, planning, management, and efficiency
- Multiple-purpose impoundment structures are to be preferred over single-purpose structures. RCW 90.54.020

**Future storage**

- "Nothing in this act shall be used to prevent future storage options, recognizing that storage may be necessary as a method of conserving water to meet both instream and out-of-stream needs." RCW 90.54.920

**Watershed planning**

- Watershed plans shall include strategies to ensure supplies to meet instream and future out-of-stream needs.
- These strategies may include "aquifer recharge and recovery … or additional water storage and water storage enhancements."
  RCW 90.54.070

# Storage Reservoir Operations: Single Purpose and Multi-purpose

**John Moody, Civil Engineer, USBR**

Why do we have dams?

***Historical uses of dams:***

- Dams are many sizes; can be found in a backyard of a residence or a large river such as Grand Coolee.
- Diversion
- Storage
- Flood control
- Power
- Recreation
- Wetland enhancement
- Fish and wildlife

***Purpose of dam***

- Raise of elevation of stream it is crossing
- Store water on channel and off channel
- Control the flow of the stream or retard the flood flow.
- Stabilize the streambed – useful on smaller projects.

***Single purpose dam***

1. Diversion dam – divert water for mills (lumber, industrial, etc.) to drive the power for industries, provide electricity.
2. Storage dam – elevation is raised and stores waster at high flow and release at low flow.
3. Flood control – Hoover dam to store the high runoff and reduce flooding downstream and release through time. Store drainage waters. Doesn't have to be on the main stem.
4. Power – Rock Island. Raise the elevation of river for potential to run generators.
5. Recreation dams – small private range of dams. For private ponds, wetland enhancement, fish and wildlife needs.

***Benefits:***

- Agriculture demand
- Municipal demand
- Industrial demand
- Flood protection
- Power generation
- Recreation
- Fish and Wildlife–fish passage and other uses need to be considered.

***Considerations for any given dam.***

- Storage of water requires volume and area.
- Reservoir is sometimes full and sometimes empty. When it varies in surface elevation it is a consideration for fish passage. Must make sure there is water on other side – it can be challenging.
- Multi-purpose: Any two single purposes or more.

## Dams: On Channel, Off Channel, New Dams vs. Enlargement of Existing, Costs

**Doug Johnson, Department of Ecology, Dam Safety**

Largest use for dams is for recreation (27%) and 25% for irrigation.

**Two classes of dams:**
- On channel – on main stem river
- Off channel – outside main river valley and on tributaries.

**Benefits of on-channel:**
- Existing conveyance.
- Store a large quantities
- Flood control benefits
- Less expensive

**Drawbacks of on-channel**
- Fish passage barrier
- Drowned riparian habitat on river
- Sediment load build up
- Relocation of people and infrastructure
- Environmental Groups oppose
- Large and expensive?

**Benefits – off channel**
- Do not have fish barrier
- Sited in a non-environmentally sensitive area.
- Reduced adverse water quality effect on main river.
- Smaller outlets and spillways.
- Sediments don't build up.

**Drawbacks -- off channel**
- Requires extensive conveyance infrastructure to get water into.
- Diversions from main river into reservoir can still adversely affect stream flow and fish and wildlife habitation.
- Cost per acre foot can be higher.
- Reservoir seepage and leakage– may need plastic geomembrane liners.

**Other options:** Raise existing dam rather than building a new project

**Benefits:**
- Dam already in place, free flowing river already gone
- Environmental impacts are smaller to new dam
- F/W already subjected to regulated flow regime.
- Incremental cost is lower.

**Storage potential of existing dams:**

Currently 165 water supply or irrigation reservoirs in WA with >50 acre feet storage.

**Drawbacks:**

- May not be able to obtain new water rights.
- Property acquisitioning and infrastructure relocation costs.
- Environmental impacts for mitigation.
- Opens door for new requirements for regulations.

New dam costs are very high.
Raises of existing dams are more cost effective.

**Summary**

- Raising existing is cheapest and most acceptable to increasing storage
- New storage dams needed, off channel is more environmentally sensitive
- Possibility of any new dams on major rivers are nil.
- Other options may be more cost effective: reuse, conservation, reallocation reservoir storage.

## Flood Control: Regional Scale Facilities

**Wayne Wagner: Corps of Engineers – Seattle district**

Water management – primary purpose is flood control.

### Columbia River Basin

Eighty percent of runoff is April to July on Columbia

1948—major flood

**PNW system of dams operated as single system.**

There are 250 Federal hydropower projects in Washington State and they are all coordinated. They all have a different purpose.

Storage: Amount of storage vs. runoff.
55 million AFT - storage capacity
Runoff = 2 x storage capacity 116?
Ninety-eight percent of benefits = power and flood control

**Operating priorities:**

Primary
- Flood control
- Fish and wildlife
- Hydropower

Secondary
- Navigation
- Irrigation
- Recreation

**Mechanics of operation on Columbia**

Flood control draw down - fixed rule curve.
Flood control draw down – variable rule curve
Flood Control – Refill and storage (was a priority for power but with ESA priority has changed)

### Western Washington

Flood control is highest priority.

No good predictor for storage. We don't know what we will get except in short time periods. Weather is unpredictable.

## STORMWATER STORAGE IN KING COUNTY: A BRIEF OVERVIEW

- Rain falling on forest produces relatively little surface runoff; rain falling on impervious surfaces such as roads and roofs runs off quickly.
- Converting forest to urban uses increases both the rate and the volume of runoff, and also causes the transport of pollutants. Without proper mitigation for this increased runoff, flooding and erosion can result.
- Stormwater storage facilities store runoff from urban areas and release it more slowly, which can prevent flooding and erosion.
- With increasing concern about endangered species, stormwater facilities are being designed to help protect aquatic habitat.
- In King County, stormwater facilities were required beginning in 1975.
- There are different types: detention and infiltration facilities to limit flow; water quality facilities to remove pollutants.
- Design Standards have become more rigorous and facility size has increased - major updates in 1990 and 1998.
- Flow-control facilities built under old standards averaged about 2,000 to 4,000 cubic feet per developed acre; new facilities average 4,000 to 10,000 cubic feet per acre. Note that 1 cubic foot = approximately 8 gallons, 1 acre foot = 43,560 cubic feet.
- The current cost of constructing flow control facilities is about $5 per cubic foot, including land.
- Flow control facilities contain little water most of the time -- they are designed to fill completely only during the largest storm events, such as 10-year or 100-year events.
- There are different types of water quality facilities -- some store water and allow pollutants to settle out, other types filter it as it passes through. Water quality facilities which store water stay full most of the year.
- Stormwater facilities which serve residential subdivisions are owned and maintained by King County; facilities serving commercial and multi-family projects are privately owned and maintained.

- Questions? Contact:

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## Aquifer Storage and Recovery

John Bowman, Lakehaven Utility District

Aquifer storage – Lakehaven project
OASIS—ASR – A water storage strategy

The resources

- Surface to ground water
- Storm water to ground water
- Groundwater to ground water
- Reclaimed water to groundwater

Tools

- Direct injection by wells
- Surface spreading
- Infiltration
- "In-lieu", **water . . .**
- Recovery

Benefits of aquifer storage

- Natural storage
- Reduced land surface impacts
- No loss of environmental
- No evaporation
- Protection from surface contaminates
- Proven viable in other states
- Cost-effective peaking and emergency supply
- Ability to implement in phases
- Ability to maximize existing supplies (potable

Concerns:

- Newness of the concept
- Undefined rules operationally and management
- Groundwater degradation
- Water right uncertainties
- Private property use
- Potential for environmental degradation.

Question: Is it of beneficial use?
Lakehaven is located in So. King Co.
Federal Way Aquifer System - Four aquifer systems
Lakehaven's OASIS project

## Basic Hydrogeology for Water Storage Task Force

**Jerry Liszak, Dept. of Ecology, Northwest Regional Office**

1. Good Afternoon! I will present a basic overview of ground water geology and specifically I will show the relationship between ground water and surface water..

2. Hydrologic Cycle

3. Water collects in pore space, saturated.: an aquifer.

4. Water flows trough the interconnected spaces.

5. Cross-section of an underground aquifer showing how under natural conditions, ground water recharge flows through the aquifer and discharges at some point. **Ground water connected to surface water**.

6. Hydrograph Separation from a stream flow gage over a 2-year period. Hydrograph separated into peaks representing storm events from surface runoff, and baseflow from ground water discharge. The ground water discharge diminishes over the summer as the water table declines.which in turn causes stream flow decline .

7. When a well is drilled into an aquifer, the initial pumping will take water from storage.

8. With continued pumping some of the ground water flow through the aquifer is CAPTURED. The hydrologic gradient, or water level, is changed and discharge to the stream is reduced. This process is called **Hydraulic Continuity**.

9. A new equilibrium with increased pumping, no water is contributed to base flow but is INDUCED to flow from the stream. Most severe when water use is highest in the summer.

10. Where streams are fed mainly by ground water, overdraft of the aquifer can reduce or eliminate streamflow and deplete surface water supplies as well.

11. Extreme declines in water levels are documented in the central plains states. Ground water withdrawals far exceed recharge and stored ground water is being mined.

12. Aquifers and aquitards. Confined vs unconfined aquifer.

13. Relation of precipitation, stream flow, and aquifer recharge over 4-yr. period. Peaks line up as response to precipitation, except deep aquifer recharge is delayed.

14. Artificial recharge can store and replace depleted water for USE. However, the water will NOT stay in one location indefinitely, therefore must be used within a relatively short time, OR it can be left to enhance instream flows. A possible mitigation for other uses.

## Referendum 38 Projects [1980 to Present]

**Ray Newkirk, Dept. of Ecology, Water Resources Program**

| DISTRICT | PROJECT DESCRIPTION | AMOUNT FUNDED |
|---|---|---|
| Wenas Irrigation District | Rehab. & enlargement of Wenas Dam | $1,000,000 |
| | Emergency repair of Wenas Dam spillway [1996 flood] | 150,000 |
| Columbia Irrigation District | Rehab. of conveyance system | 482,000 |
| | Design & install 2 fishways & screen intakes | 1,255,000 |
| | Develop a comprehensive water conservation plan | 58,000 |
| | Canal silt removal [1996 flood] | 5,000 |
| Brays Landing Irr. District | Const. of new irrigation system | 1,033,000 |
| Agnew Irrigation District | Rehab. of McDonnell Creek diversion structure | 65,000 |
| Stemilt Irrigation District | Rehab.of conveyance system & reservoir construction | 484,000 |
| | Reconstruction of Stemilt Cr. diversion str. & piping | 46,000 |
| | Lily Lake Dam rehabilitation | 32,000 |
| | Develop a comprehensive water conservation plan | 72,000 |
| Wenatchee Rec. District | Rehab. of Columbia River bridge deck | 43,000 |
| | Flume reconst. & main canal lining | 155,000 |
| | Replacement of Sunnyslope Spillway | 53,000 |
| Kiona Irrigation District | Develop a comprehensive water conservation plan | 46,000 |
| | Construct a pressurized pump & pipe distribution system | 412,000 |
| Kennewick Irr. District | Canal lining, culvert replacement, & LID construction | 351,000 |
| | Develop a water conservation plan [YRBWEP] | 200,000 |
| Yakima-Tieton I. D. | Construct dam & rereg. resv., & pressurize distribution sys. | 6,672,000 |
| Methow Valley I. D. | Emergency flume replacement | 26,000 |
| | Engr. study & investigation of dist. system &management | 53,000 |
| | Emergency canal repair | 5,000 |
| | Dev. a comp. water consv. plan, design a pressurized pipe system, construct 3 test wells, & pay attorney fees | 570,000 |
| Naches-Selah I. D. | Siphon replacement | 391,000 |
| | Develop a comprehensive water conservation plan | 92,000 |
| | Emergency flume replacement | 256,000 |
| | Emergency canal break repair | 39,000 |
| Greater Wenatchee I. D. | Total district rehab. | 1,136,000 |
| Highland Irrigation District | Bell Creek Siphon replacement | 169,000 |
| Franklin Co. I. D. # 1 | Rehab. of pump stations & fish screens | 203,000 |
| Granger Irrigation District | Piping of open-ditch lateral | 50,000 |

| | | |
|---|---|---|
| Wolf Cr. Rec. District | Patterson Lake Dam spillway rehab | 48,000 |
| | Patterson Mt. pipeline replacement | 79,000 |
| Ahtanum Irrigation District | Develop a comprehensive water conservation plan | 120,000 |
| City of Yakima | Design & construct a fishway & screen intake | 398,000 |
| Outlook Irrigation District | Pipe open-ditch laterals | 47,000 |
| | Develop a comprehensive water conservation plan | 36,000 |
| South Naches I. D. | Develop a comprehensive water conservation plan | 38,000 |
| East Columbia Basin I. D. | Concrete line & pipe open-ditch laterals | 212,000 |
| | Develop a comprehensive water conservation plan | 35,000 |
| | Emergency main canal repair | 630,000 |
| | Lateral improvements & underdrain culvert linings | 608,000 |
| Oroville-Tonasket I. D. | Palmer Lake dam feasibility study | 37,000 |
| Icicle Irrigation District | Mt. Home Flume rehab | 176,000 |
| | Develop a comprehensive water conservation plan | 34,000 |
| | Emergency stabilization of Deadman's Hill landslide | 11,000 |
| | Division 3-A emergency canal replacement | 13,000 |
| Peshastin I. D. | Mt. Home Flume rehab. | 118,000 |
| | Develop a comprehensive water conservation plan | 18,000 |
| | Pipe the Tandy Ditch | 100,000 |
| | Stines Hill emergency piping project | 105,000 |
| Selah-Moxee I. D. | Develop a comprehensive water conservation plan | 60,000 |
| Wenatchee Hts. Rec. Dist. | Upper Wheeler Dam rehab | 433,000 |
| Lake Chelan Rec. Dist. | Develop a comprehensive water conservation plan | 15,000 |
| | Lateral pipe replacement | 754,000 |
| | Wapato Dam spillway rehab | 195,000 |
| | Booster pumps & telemetry | 120,000 |
| | Water meters & valves replacement | 270,000 |
| | Pump, motor, & reservoir rehab. | 193,000 |
| Union Gap I. D. | Develop a water conservation plan [YRBWEP] | 30,000 |
| Benton Irrigation District | Develop a water conservation plan [YRBWEP] | 75,000 |
| Aeneas Lake I. D. | Develop a comprehensive water conservation plan | 27,000 |
| Kittitas Rec. District | Bristol Flats emergency canal repair | 525,000 |
| | Develop a water conservation plan [YRBWEP] | 65,000 |
| | Emergency bank stabilization on Big Cr. | 8,000 |
| Okanogan Irrigation Dist. | Develop a comprehensive water conservation plan | 10,000 |
| Roza Irrigation District | Lateral & canal rehab. | 2,020,000 |
| | Wasteway # 7 re-regulation reservoir construction | 101,000 |
| | Main canal automation & re-regulation reservoir report | 26,000 |
| | Develop a comprehensive water conservation plan | 43,000 |
| | Develop a water conservation plan [YRBWEP] | 7,000 |
| | Feasibility study for Sulphur Cr. re-reg reservoir [YRBWEP] | 165,000 |
| Sunnyside Valley I. D. | Pipe open-ditch laterals | 1,733,000 |

| | | |
|---|---|---|
| | Develop a comprehensive water conservation plan | 158,000 |
| | Sulphur Cr. wasteway intake rehab. | 28,000 |
| | Prosser pipeline rehab. | 36,000 |
| | Crown Point Orchards LID construction | 23,000 |
| Sunnyside Board of Control | Main canal alignment | 950,000 |
| | Snipes Lateral lining | 40,000 |
| Roza/Sunnyside Board of Joint Control | Develop a water conservation plan [YRBWEP] | 26,000 |
| | Granger Drain water reuse basins | 47,000 |
| | Feasibility study for canal automation, re-reg reservoirs & piping laterals [YRBWEP] | 150,000 |

# STORAGE AND THE NORMATIVE RIVER CONCEPT

**Tom Ring, Hydrogeologist, Yakama Nation Water Program**

## INTRODUCTION

Talk will:

- Define the Normative River Concept.
- Answer questions raised in last meeting about whether floods are good or bad for fish?
- Discuss beneficial functions of natural floods.

This talk represents the views of the author and are not the policy position of the Yakama Nation.

## NORMATIVE RIVER CONCEPT

Normative Ecosystem: An ecosystem where specific functional norms or standards that are essential to maintain diverse and productive populations are provided. The normative river ecosystem combines physical habitat with a flow regime designed to create and maintain a continuum of high quality habitat for all life history stages of the salmon species of interest. Before development, the natural hydrograph interacting with the channel, flood plain, and shallow groundwater system formed the physical template into which native species evolved. The challenge of the normative ecosytem concept is to identify and recreate those key features of the natural hydrograph and physical habitat necessary to restore and maintain production and diversity of salmon while continuing to meet human needs.

(Slide: Map of Yakima Basin. Reservoirs, Upper Mainstem, Naches Arm, Gages, Cascades, Ridges and Valleys, Floodplains)

## STORAGE, RIVER REGULATION, AND THE NORMATIVE ECOSYSTEM

Water storage and Regulation alter the ecosystem's physical template.

(Slide: Regulated and estimated unregulated hydrographs at four gages in basin.)

The "natural" hydrograph displays spring to early summer freshet, base flows in August-September, higher autumn flows as precipitation increases and evapotranspiration decreases.

Effects of storage and river regulation seen in comparative hydrographs are:

Loss of freshet (compare Upper Mainstem to Naches Arm);
Unnaturally low (various places) or high (Upper Main stem, Yakima Canyon) flows depending on location and timing.

More rapid flow fluctuations are also typical of regulated rivers (e.g below Sunnyside Dam).

## FLOODS AND WATER STORAGE

Natural floods provide beneficial functions in a normative ecosystem. Floods build and maintain key cold water habitats for salmonids and the associated food web. These fuctions occur when the river system is connected with the natural water storage features in the watershed.

Natural storage: In a properly functioning watershed, a portion of floodwaters is captured in the soil, in complex channel features, and in the shallow groundwater system. This stored water is released over time to the river system. These storage mechanisms, when working properly, lessen downstream flood severity and improve conditions for cold-water fish during the hot, dry part of the year. Many land use practices tend to short circuit these storage mechanisms, increasing peak flows and decreasing base flows.

Of particular importance as natural storage features are flood plains. Contemporary river ecology emphasizes the influence of river-deposited (alluvial) flood plain reaches interacting with a normative hydrograph on the production and survival of anadromous fishes and associated aquatic food webs in gravel bed river systems such as the Yakima.

Properly functioning flood plain reaches:

Capture flood flows, reducing peak flows and decreasing downstream flood damage;
(Slide: Attenuation of flood wave by flood plain)

Sustain baseflow (alluvial aquifers"act as the flywheel on an engine");
(Slide: Cross Section along Yakima River. Alluvial aquifers recharge from river at upstream end of reach, discharge to river at downstream end.)

Provide abundant, complex, diverse, thermally moderate, habitats for cold water fishes (springbrooks);
(Slide: Yakima River, side channels, springbrooks above union gap)

Moderate water temperature (reduce both seasonal and daily fluctuations)
(Slide: Comparison of temperature in river and adjacent springbrook showing lower daily high temperatures in springbrook. In Flathead River example, river 2degrees colder at downstream end of floodplain.}.

Provide thermal refugia;
(Slide: Thermal infrared image of Yakima River. Apologize for lack of legend. Red hot, blue cold. Note cool springbrooks that are the legacy of high, cold flows earlier in year and possibly from previous year's flood.)

Generate food web production; gravel is habitat for invertebrates (hyporheic zone);
(Slide: Diagram of hyporheic zone. Underflow zone of river, shallow surface-groundwater interaction zone. Contains preferential flowpaths along buried stream channels.)
(Slide: Photograph of aquatic invertebrates from well near Toppenish Creek. Stone flies (left) spend all but a few weeks of their 4 year lives in the shallow aquifer system.

These invertebrates provide food salmon need to gain energy for smoltification).

Floods as builders of habitat:

Transport, rework and clean channel gravels, and deposit fines on flood plain

Create and rujuvenate main and side channel habitats.

To summarize, floods construct and maintain the physical habitat and are the source of the cold water budget needed to provide low velocity, thermally moderate, food rich habitats used by salmonids as hospitable "steppingstones" as they move up and down the river system.

This year's exceptional fish runs are returning adults from years of floods and runoff too great to store in the reservoir system.

Flood control and habitat (When are floods bad for fish?).

Flood control by reservoir storage truncates hydrograph, reducing storage of cold freshet water in ground storage;

(Slide: Selah Valley)

Flood control structures, either intentional like dikes or accidental like highways and railroads:

Restrict access of river to flood plain, lessening flood plain storage;

Increase velocities, causing armoring of channel;

Move water out of watershed more quickly, forgoing opportunities for natural; storage.

(Slide: 1996 flood on Toppenish Creek)

# Becoming climate-wise with Washington's water

**Philip Mote**
**JISAO/SMA Climate Impacts Group**
**University of Washington**

## Pacific Northwest: unique location

- Greatest sensitivity to Pacific Ocean
- ENSO (El Nino-Southern Oscillation)
- PDO (Pacific Decadal Oscillation)
- Columbia River flow can be predicted >1 year in advance
- Small variations in temperature and precipitation affect flow in a big way - what if they change?

## Scientific consensus on climate change

- Carbon dioxide and other greenhouse gases warm the planet
- Greenhouse gases have been increasing ($CO_2$ up 30%) and will increase for a long time
- The planet has warmed 0.6°C (1°F) since 1900
- Natural causes an unlikely explanation
- Further warming of 1.3-2.2°C (2-4°F) by the time of $CO_2$ doubling (2050-2100)

## What might climate change look like in the Northwest?

- 20th century warming: 1.5°F
- the future: 10 scenarios of future climate
- changes compared to 20th century average:
- 3.1°F warmer by 2020s (2.2°-3.7°)
- 5.3°F warmer by 2050s (4.6°-6.1°)
- wetter winters (Oct-Mar 0-22% increase)
- summers: models divided (-7% to +14%)

## The main impact: less snow
## Impacts of hydrologic changes

- Less snow, earlier melt means less water in summer
- irrigation
- urban uses
- fisheries protection
- energy production
- More water in winter
- energy production
- flooding

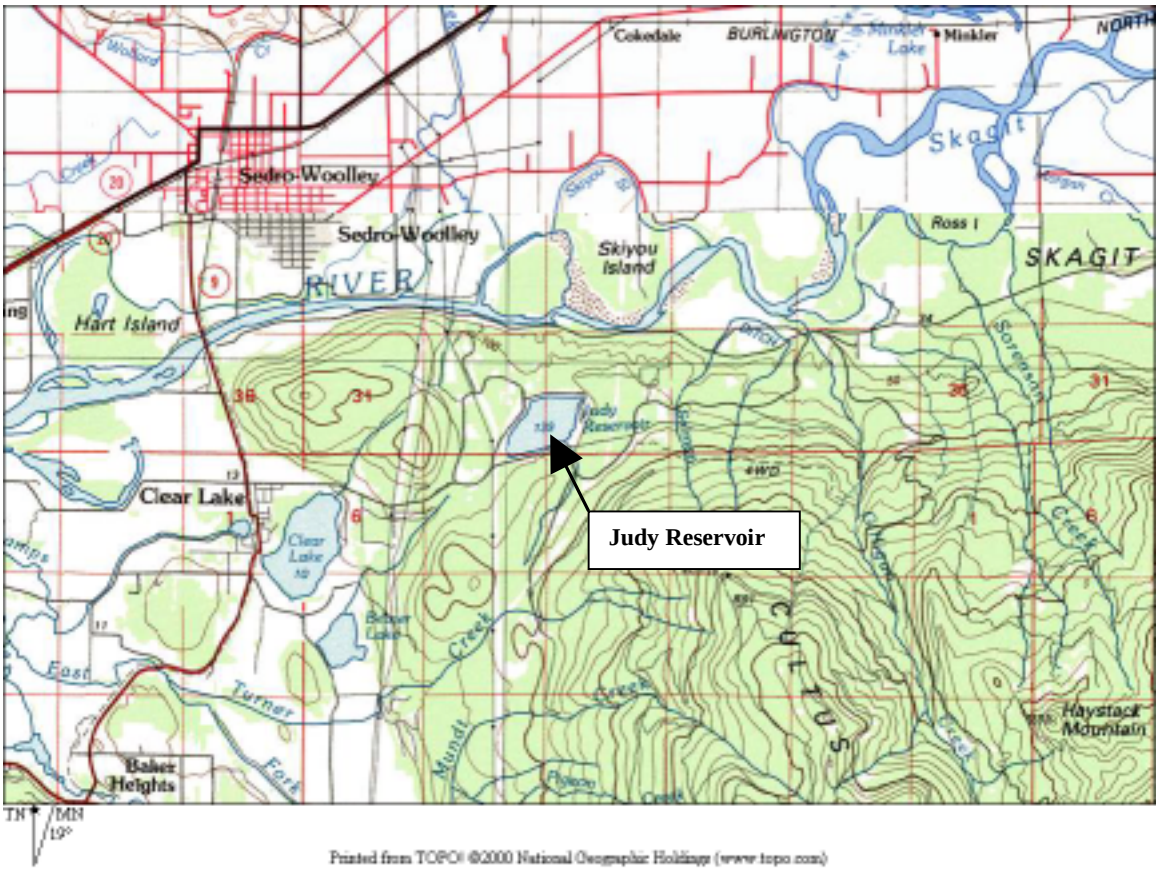
## Storage of Columbia River water
## Conclusions

- Climate change likely to significantly affect the Pacific Northwest
- Main impact: reduction in snowpack, summer streamflow
- More dams? Or more flexible management?
- Consider climate a component of any long-term plan

# Appendix B.
# Judy Reservoir Enlargement Case Study

Judy Reservoir Project, Looking West

As part of the background information for the Task Force, the Judy Reservoir Expansion Project was presented as a concrete example of how increased water storage can be accomplished. The following is a summary of that project.




Judy Reservoir Location Map

# Background on Judy Reservoir

Judy Reservoir is a raw water supply reservoir owned and operated by the Public Utility District No. 1 of Skagit County. The PUD supplies water to approximately 50,000 customers in and around the Cities of Mount Vernon, Burlington, and Sedro-Woolley, Washington. The PUD needs to expand its system to meet growing water demand in its service area. Increasing the capacity of Judy Reservoir was determined to be the most advantageous expansion alternative. An expanded Judy Reservoir will allow the PUD to continue serving most of its customers by gravity.

The expanded reservoir will be filled with water from the four Cultus mountain streams, in accordance with the existing PUD's water rights and a memorandum of agreement recently executed by the PUD, the City of Anacortes, Skagit County, the Upper Skagit, Swinomish and Sauk-Suiattle Indian Tribes and the Washington Departments of Ecology and Fish and Wildlife. The expanded reservoir will minimize withdrawal of water from the Lower Skagit River during low flow periods by reducing the frequency of use of the interties to the Anacortes water system.

Judy Reservoir is fed via pipelines from diversion structures from four Cultus mountain streams west and south of the reservoir. The reservoir is formed by two earthfill dams on the south and north sides of the reservoir, referred to as Dam A and Dam B, respectively. The dams were constructed in 1946 and increased in height by 16 feet in 1963. The reservoir is located in the Janicki Creek watershed. However, the creek itself is diverted around the reservoir by means of an earthen bypass channel constructed when the dams were raised in 1963. At its downstream end, Janicki Creek was routed through a steep culvert that also comprised the service spillway for Dam B.

# Project Description

The current project, which began in 1999, added another 10 feet to the height of the dams, using materials excavated on site adjacent to the new inundation area. This will increase reservoir capacity by about 1700 acre-feet to a total of 4500 acre-feet. Because the raised reservoir elevation would inundate the existing Janicki Creek diversion channel, the proposed action includes construction of a new diversion channel at a higher elevation. The proposed project also includes installation of an alternate supply pipeline, modifications to the reservoir drain line at Dam B, and construction of a new gabion spillway to replace the old culvert spillway and meet state dam safety requirements.

Unlike the existing diversion channel, the new Janicki Creek diversion channel will include numerous habitat features. In addition, approximately 14 acres of wetlands will be created to in place of the approximately 3 acres of existing wetland that will be inundated by the enlarged reservoir. As a result, the project will result in a substantial improvement of aquatic habitat at the project site. The project will also provide improved habitat for the trumpeter swans that use the reservoir in the winter.

Construction of the Judy Reservoir Expansion project began in May 1999. Prior to beginning construction, the PUD applied for and obtained the following permits:

1. Shoreline Substantial Development/Conditional Use Permit
2. Grading Permit
3. Forest Practices Permit
4. Hydraulic Project Approval
5. Clean Water Act Section 404 Permit
6. Dam Construction Permit

During the permit application process, the PUD worked closely with the Washington Department of Fish and Wildlife (WDFW) to ensure that the project would result in a net improvement in fish and wildlife habitat.

The PUD also had to comply with the Endangered Species Act, through the Clean Water Act Section 404 Permit. This necessitated consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service and the completion of a biological assessment. The Section 404 permit placed conditions on the project so that Bald Eagles and Trumpeter Swans would not be harmed.

# Project Funding and Costs

The total cost for the Judy Reservoir Enlargement Project is approximately $9 million. The individual costs for the principal project components are listed as follows:

| | |
|---|---|
| Planning, Permitting & Design | $1,243,600 |
| Legal | $ 98,400 |
| Financing | $ 215,000 |
| Construction | $7,352,500 |
| **TOTAL** | **$8,909,500** |

The Judy Reservoir Expansion Project is being financed totally from PUD funds.
Financing came from $6,000,000.00 of a $12,000,000.00 Municipal Bond sale, and the balance from timber and surplus property sales.

# Timeline

An enlargement of Judy Reservoir was originally considered when the dams were last raised in 1963. However, the decision to move forward with the current project started in 1994, when the need to store additional water became apparent and the District began negotiations with the three tribes regarding in stream flows in our diversions (Cultus Streams). The PUD got serious in 1995 and 1996 with the signing of the Memorandum of Agreement. In the latter part of 1995 and early 1996 the PUD selected a design engineer and set the scope. SEPA was submitted in November of 1997 with construction slated to begin in the summer of 1998. We had allowed one year for the permit process and it took around eleven months with the 404 permit the last acquired. However, this timeframe would likely be slightly longer now with new ESA listings in need of consideration.

# Conclusions and Lessons Learned

By the end of 2000, the Phase I project to raise the dams was about 80% complete. It is anticipated that the construction of this phase will be completed in 2001, allowing the reservoir to be filled to the new, higher level. Phase 2 permitting for the Skagit River pumping plant is now beginning. When completed, this project should meet the needs of Skagit County for the next 50 years. The investment in both projects allows the District to supply safe reliable drinking water for all the counties out of stream needs while protecting the in stream needs of the rivers and streams. In conclusion, these sort of projects are very sound investments in providing environmental protection while not ignoring economic growth.

The lessons learned from this project of importance to the task force would include:

- Even raising existing dams that are sited on a man-made reservoir involve considerable time and effort to obtain environmental permits.
- Allow at least 1 year for permitting, possibly longer with ESA listings.
- Make sure that wildlife agency staff fully understand project characteristics and construction methods.

# Appendix C.
# Washington State Laws Related to Water Storage

# Washington State Laws Related to Water Storage
# September 11, 2000

CONTENTS



## LEGISLATIVE FINDINGS

RCW 43.83B.010
Declaration.
The long-range development goals for the state of Washington must include the provision of those supportive public services necessary for the development and expansion of industry, commerce, and employment including the furnishing of an adequate supply of water for domestic, industrial, and agricultural purposes.
[1972 ex.s. c 128 § 1.]

**RCW 43.99E.010**
**Declaration.**
The long-range development goals for the state of Washington must include the provision of those supportive public services necessary for the development and expansion of industry, commerce, and employment including the furnishing of an adequate supply of water for domestic, industrial, agricultural, municipal, fishery, recreational, and other beneficial uses.
[1979 ex.s. c 234 § 1.]

**Finding -- Intent--1997 c 443:**
**(for RCW 43.21A.064(5) Assistance to applicants)**
"The legislature finds that there is a need for development of additional water resources to meet the forecasted population growth in the state. It is the intent of chapter 443, Laws of 1997 to direct the responsible agencies to assist applicants seeking a safe and reliable water source for their use. Providing this assistance for public water supply systems can be accomplished through assistance in the creation of municipal interties and transfers, additional storage capabilities, enhanced conservation efforts, and added efficiency standards for using existing supplies."
[1997 c 443 § 1.]

**Findings -- Purpose -- 1997 c 360:**
**(for RCW 90.03.255 Consideration of water impoundment)**
"The legislature finds that in many basins in the state there is water available on a seasonal basis that is in excess of the needs of either existing water right holders or instream resources. The legislature finds that excess waters often result in significant flooding and damage to public and private resources. Further, it is in the public interest to encourage the

impoundment of excess water and other measures that can be used to offset the impact of withdrawals and diversions on existing rights and instream resources. Further, in some areas of the state additional supplies of water are needed to meet the needs of a growing economy and population. The legislature finds there is a range of alternatives that offset the impacts that should be encouraged including the creation, restoration, enhancement, or enlargement of ponds, wetlands, and reservoirs and the artificial recharge of aquifers.

The purpose of this act is to foster the improvement in the water supplies available to meet the needs of the state. It is the goal of this act to strengthen the state's economy while maintaining and improving the overall quality of the state's environment."

[1997 c 360 § 1.]

## RCW 90.44.460

**Reservoir permits.**

The legislature recognizes the importance of sound water management. In an effort to promote new and innovative methods of water storage, the legislature authorizes the department of ecology to issue reservoir permits that enable an entity to artificially store and recover water in any underground geological formation, which qualifies as a reservoir under RCW 90.03.370.

[2000 c 98 § 1.]

## *POLICIES*

RCW 90.03.005
State water policy -- Cooperation with other agencies -- Reduction of wasteful practices.
It is the policy of the state to promote the use of the public waters in a fashion which provides for obtaining maximum net benefits arising from both diversionary uses of the state's public waters and the retention of waters within streams and lakes in sufficient quantity and quality to protect instream and natural values and rights. Consistent with this policy, the state supports economically feasible and environmentally sound development of physical facilities through the concerted efforts of the state with the United States, public corporations, Indian tribes, or other public or private entities. Further, based on the tenet of water law which precludes wasteful practices in the exercise of rights to the use of waters, the department of ecology shall reduce these practices to the maximum extent practicable, taking into account sound principles of water management, the benefits and costs of improved water use efficiency, and the most effective use of public and private funds, and, when appropriate, to work to that end in concert with the agencies of the United States and other public and private entities.
[1989 c 348 § 2; 1979 ex.s. c 216 § 8.]

**RCW 90.54.020**
**General declaration of fundamentals for utilization and management of waters of the state.**
Utilization and management of the waters of the state shall be guided by the following general declaration of fundamentals:

(1) – (3) (MATERIAL OMMITTED)

(4) The development of multipurpose water storage facilities shall be a high priority for programs of water allocation, planning, management, and efficiency. The department, other state agencies, local governments, and planning units formed under *section 107 or 108 of this act shall evaluate the potential for the development of new storage projects and the benefits and effects of storage in reducing damage to stream banks and property, increasing the use of land, providing water for municipal, industrial, agricultural, power generation, and other beneficial uses, and improving stream flow regimes for fisheries and other instream uses.

(5) Adequate and safe supplies of water shall be preserved and protected in potable condition to satisfy human domestic needs.

(6) Multiple-purpose impoundment structures are to be preferred over single-purpose structures. Due regard shall be given to means and methods for protection of fishery resources in the planning for and construction of water impoundment structures and other artificial obstructions.

(7) – (10)(MATERIAL OMMITTED)

(11) Water management programs, including but not limited to, water quality, flood control, drainage, erosion control and storm runoff are deemed to be in the public interest.
[1997 c 442 § 201; 1989 c 348 § 1; 1987 c 399 § 2; 1971 ex.s. c 225 § 2.]

**RCW 75.20.050**
**Review of permit applications to divert or store water -- Water flow policy.**

It is the policy of this state that a flow of water sufficient to support game fish and food fish populations be maintained at all times in the streams of this state.

The director of ecology shall give the director notice of each application for a permit to divert or store water. The director has thirty days after receiving the notice to state his or her objections to the application. The permit shall not be issued until the thirty-day period has elapsed.

The director of ecology may refuse to issue a permit if, in the opinion of the director, issuing the permit might result in lowering the flow of water in a stream below the flow necessary to adequately support food fish and game fish populations in the stream.

The provisions of this section shall in no way affect existing water rights.

[1993 sp.s. c 2 § 29; 1988 c 36 § 32; 1986 c 173 § 7; 1983 1st ex.s. c 46 § 71; 1955 c 12 § 75.20.050. Prior: 1949 c 112 § 46; Rem. Supp. 1949 § 5780-320.]

**RCW 90.22.010**

**Establishment of minimum water flows or levels -- Authorized -- Purposes.**

The department of ecology may establish minimum water flows or levels for streams, lakes or other public waters for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same. In addition, the department of ecology shall, when requested by the department of fish and wildlife to protect fish, game or other wildlife resources under the jurisdiction of the requesting state agency, or if the department of ecology finds it necessary to preserve water quality, establish such minimum flows or levels as are required to protect the resource or preserve the water quality described in the request or determination. Any request submitted by the department of fish and wildlife shall include a statement setting forth the need for establishing a minimum flow or level. When the department acts to preserve water quality, it shall include a similar statement with the proposed rule filed with the code reviser. This section shall not apply to waters artificially stored in reservoirs, provided that in the granting of storage permits by the department of ecology in the future, full recognition shall be given to downstream minimum flows, if any there may be, which have theretofore been established hereunder.

[1997 c 32 § 4; 1994 c 264 § 86; 1988 c 47 § 6. Prior: 1987 c 506 § 96; 1987 c 109 § 103; 1969 ex.s. c 284 § 3.]

RCW 90.22.030

Existing water and storage rights -- Right to divert or store water.

The establishment of levels and flows pursuant to RCW 90.22.010 shall in no way affect existing water and storage rights and the use thereof, including but not limited to rights relating to the operation of any hydroelectric or water storage reservoir or related facility. No right to divert or store public waters shall be granted by the department of ecology which shall conflict with regulations adopted pursuant to RCW 90.22.010 and 90.22.020 establishing flows or levels. All regulations establishing flows or levels shall be filed in a "Minimum Water Level and Flow Register" of the department of ecology.

[1988 c 127 § 81; 1969 ex.s. c 284 § 5.]

**RCW 90.54.180**

**Water use efficiency and conservation programs and practices.**

Consistent with the fundamentals of water resource policy set forth in this chapter, state and local governments, individuals, corporations, groups and other entities shall be encouraged to carry out water use efficiency and conservation programs and practices consistent with the following:

(1) Water efficiency and conservation programs should utilize an appropriate mix of economic incentives, cost share programs, regulatory programs, and technical and public information efforts. Programs which encourage voluntary participation are preferred.

(2) Increased water use efficiency should receive consideration as a potential source of water in state and local water resource planning processes. In determining the cost-effectiveness of alternative water sources, consideration should be given to the benefits of conservation, waste water recycling, and impoundment of waters.

(3) In determining the cost-effectiveness of alternative water sources, full consideration should be given to the benefits of storage which can reduce the damage to stream banks and property, increase the utilization of land, provide water for municipal, industrial, agricultural, and other beneficial uses, provide for the generation of electric power from renewable resources, and improve stream flow regimes for fishery and other instream uses.

(4) Entities receiving state financial assistance for construction of water source expansion or acquisition of new sources shall develop, and implement if cost-effective, a water use efficiency and conservation element of a water supply plan pursuant to RCW 43.20.230(1).

(5) State programs to improve water use efficiency should focus on those areas of the state in which water is overappropriated; areas that experience diminished streamflows or aquifer levels; and areas where projected water needs, including those for instream flows, exceed available supplies.

(6) Existing and future generations of citizens of the state of Washington should be made aware of the importance of the state's water resources and the need for wise and efficient use and development of this vital resource. In order to increase this awareness, state agencies should integrate public education on increasing water use efficiency into existing public information efforts. This effort shall be coordinated with other levels of government, including local governments and Indian tribes.
[1989 c 348 § 5.]

**RCW 90.54.800**
**Policy guidelines.**
Future development of hydropower and protection of river-related resources shall be guided by policies and programs which:

(1) Create opportunities for balanced development of cost-effective and environmentally sound hydropower projects by a range of development interests;

(2) Protect significant values associated with the state's rivers, including fish and wildlife populations and habitats, water quality and quantity, unique physical and botanical features, archeological sites, and scenic and recreational resources;

(3) Protect the interests of the citizens of the state regarding river-related economic development, municipal water supply, supply of electric energy, flood control, recreational opportunity, and environmental integrity;

(4) Fully utilize the state's authority in the federal hydropower licensing process.
[1989 c 159 § 3.]

## *AGENCY POWERS*

**RCW 43.21A.064**
**Powers and duties -- Water resources.**
Subject to RCW 43.21A.068, the director of the department of ecology shall have the following powers and duties:

(1) The supervision of public waters within the state and their appropriation, diversion, and use, and of the various officers connected therewith;

(2) Insofar as may be necessary to assure safety to life or property, the director shall inspect the construction of all dams, canals, ditches, irrigation systems, hydraulic power plants, and all other works, systems, and plants pertaining to the use of water, and may require such necessary changes in the construction or maintenance of said works, to be made from time to time, as will reasonably secure safety to life and property;

(3) The director shall regulate and control the diversion of water in accordance with the rights thereto;

(4) The director shall determine the discharge of streams and springs and other sources of water supply, and the capacities of lakes and of reservoirs whose waters are being or may be utilized for beneficial purposes;

(5) The director shall, if requested, provide assistance to an applicant for a water right in obtaining or developing an adequate and appropriate supply of water consistent with the land use permitted for the area in which the water is to be used and the population forecast for the area under RCW 43.62.035. If the applicant is a public water supply system, the supply being sought must be used in a manner consistent with applicable land use, watershed and water system plans, and the population forecast for that area provided under RCW 43.62.035;

(6)(MATERIAL OMMITTED)

(7) The director shall render when required by the governor, a full written report of the office's work with such recommendations for legislation as the director deems advisable for the better control and development of the water resources of the state;

(8) – (10) (MATERIAL OMMITTED)
[1997 c 443 § 2; 1995 c 8 § 3; 1977 c 75 § 46; 1965 c 8 § 43.21.130. Prior: 1961 c 19 § 1; prior: (i) 1951 c 57 § 3; 1921 c 7 § 72; RRS § 10830. (ii) 1951 c 57 § 3; 1917 c 117 § 8; RRS § 7358. Formerly RCW 43.21.130.]

**RCW 43.21A.069**
**Powers and duties -- Flood control.**
The department of ecology shall exercise all the powers and perform all the duties prescribed by law with respect to flood control.

**RCW 43.27A.090**
**Powers and duties of department.**
The department shall be empowered as follows:

(1) To represent the state at, and fully participate in, the activities of any basin or regional commission, interagency committee, or any other joint interstate or federal-state agency, committee or commission, or publicly financed entity engaged in the planning, development, administration, management, conservation or preservation of the water resources of the state.

(2) To prepare the views and recommendations of the state of Washington on any project, plan or program relating to the planning, development, administration, management, conservation and preservation of any waters located in or affecting the state of Washington, including any federal permit or license proposal, and appear on behalf of, and present views and recommendations of the state at any proceeding, negotiation or hearing

conducted by the federal government, interstate agency, state or other agency.

(3) To cooperate with, assist, advise and coordinate plans with the federal government and its officers and agencies, and serve as a state liaison agency with the federal government in matters relating to the use, conservation, preservation, quality, disposal or control of water and activities related thereto.

(4) To cooperate with appropriate agencies of the federal government and/or agencies of other states, to enter into contracts, and to make appropriate contributions to federal or interstate projects and programs and governmental bodies to carry out the provisions of this chapter.

(5) To apply for, accept, administer and expend grants, gifts and loans from the federal government or any other entity to carry out the purposes of this chapter and make contracts and do such other acts as are necessary insofar as they are not inconsistent with other provisions hereof.

(6) To develop and maintain a coordinated and comprehensive state water and water resources related development plan, and adopt, with regard to such plan, such policies as are necessary to insure that the waters of the state are used, conserved and preserved for the best interest of the state. There shall be included in the state plan a description of developmental objectives and a statement of the recommended means of accomplishing these objectives. To the extent the director deems desirable, the plan shall integrate into the state plan, the plans, programs, reports, research and studies of other state agencies.

(7) To assemble and correlate information relating to water supply, power development, irrigation, watersheds, water use, future possibilities of water use and prospective demands for all purposes served through or affected by water resources development.

(8) To assemble and correlate state, local and federal laws, regulations, plans, programs and policies affecting the beneficial use, disposal, pollution, control or conservation of water, river basin development, flood prevention, parks, reservations, forests, wildlife refuges, drainage and sanitary systems, waste disposal, water works, watershed protection and development, soil conservation, power facilities and area and municipal water supply needs, and recommend suitable legislation or other action to the legislature, the congress of the United States, or any city, municipality, or to responsible state, local or federal executive departments or agencies.

(9) To cooperate with federal, state, regional, interstate and local public and private agencies in the making of plans for drainage, flood control, use, conservation, allocation and distribution of existing water supplies and the development of new water resource projects.

(MATERIAL OMMITTED)

[1988 c 127 § 25; 1967 c 242 § 9.]

RCW 86.16.025

Authority of department.

(for the department of ecology)

Subject to RCW 43.21A.068, with respect to such features as may affect flood conditions, the department shall have authority to examine, approve or reject designs and plans for any structure or works, public or private, to be erected or built or to be reconstructed or modified upon the banks or in or over the channel or over and across the floodway of any stream or body of water in this state.

[1995 c 8 § 4; 1989 c 64 § 2; 1987 c 109 § 50; 1939 c 85 § 1; 1935 c 159 § 6; RRS § 9663A-6. Formerly RCW 86.16.020, part.]

**RCW 86.16.035**
**Department of ecology -- Control of dams and obstructions.**
Subject to RCW 43.21A.068, the department of ecology shall have supervision and control over all dams and obstructions in streams, and may make reasonable regulations with respect thereto concerning the flow of water which he deems necessary for the protection to life and property below such works from flood waters.
[1995 c 8 § 5. Prior: 1987 c 523 § 9; 1987 c 109 § 53; 1935 c 159 § 8; RRS § 9663A-8. Formerly RCW 86.16.030, part.]

RCW 90.54.100
Department to evaluate needs for projects and alternative methods of financing.
The department of ecology shall as a matter of high priority evaluate the needs for water resource development projects and the alternative methods of financing of the same by public and private agencies, including financing by federal, state and local governments and combinations thereof. Such evaluations shall be broadly based and be included as a part of the comprehensive state water resources program relating to uses and management as defined in RCW 90.54.030.
[1997 c 32 § 5; 1971 ex.s. c 225 § 11.]

RCW 90.54.160
Department to report on dam safety.
The department of ecology shall report to the legislature on the last working day of December of 1984, 1985, and 1986, and thereafter as deemed appropriate by the department, on dam facilities that exhibit safety deficiencies sufficient to pose a significant threat to the safety of life and property. The report shall identify the owner or owners of such facilities, detail the owner's ability and attitude towards correcting such deficiencies, and provide an estimate of the cost of correcting the deficiencies if a study has been completed.
[1984 c 83 § 1.]

**RCW 90.38.020**
**Acquisition of trust water rights.**
(1) The department may acquire water rights, including but not limited to storage rights, by purchase, gift, or other appropriate means other than by condemnation, from any person or entity or combination of persons or entities. Once acquired, such rights are trust water rights.
(2) The department may make such other arrangements, including entry into contracts with other persons or entities as appropriate to ensure that trust water rights acquired in accordance with this chapter can be exercised to the fullest possible extent.
(3) The trust water rights may be acquired on a temporary or permanent basis.
[1989 c 429 § 3.]

**RCW 43.20.050**
**Powers and duties of state board of health -- State public health report -- Delegation of authority -- Enforcement of rules.**
(1) (MATERIAL OMMITTED)
(2) In order to protect public health, the state board of health shall:
(a) Adopt rules necessary to assure safe and reliable public drinking water and to protect the public health. Such rules shall establish requirements regarding:

(i) The design and construction of public water system facilities, including proper sizing of pipes and storage for the number and type of customers;

(ii) Drinking water quality standards, monitoring requirements, and laboratory certification requirements;

(iii) Public water system management and reporting requirements;

(iv) Public water system planning and emergency response requirements;

(v) Public water system operation and maintenance requirements;

(vi) Water quality, reliability, and management of existing but inadequate public water systems; and

(vii) Quality standards for the source or supply, or both source and supply, of water for bottled water plants.

(b) – (f) (MATERIAL OMMITTED)]

(3) The state board may delegate any of its rule-adopting authority to the secretary and rescind such delegated authority.

(4) All local boards of health, health authorities and officials, officers of state institutions, police officers, sheriffs, constables, and all other officers and employees of the state, or any county, city, or township thereof, shall enforce all rules adopted by the state board of health. In the event of failure or refusal on the part of any member of such boards or any other official or person mentioned in this section to so act, he shall be subject to a fine of not less than fifty dollars, upon first conviction, and not less than one hundred dollars upon second conviction.

(5) (MATERIAL OMMITTED)

[1993 c 492 § 489; 1992 c 34 § 4. Prior: 1989 1st ex.s. c 9 § 210; 1989 c 207 § 1; 1985 c 213 § 1; 1979 c 141 § 49; 1967 ex.s. c 102 § 9; 1965 c 8 § **43.20.050**; prior: (i) 1901 c 116 § 1; 1891 c 98 § **2**; RRS § 6001. (ii) 1921 c 7 § 58; RRS § 10816.]

**RCW 43.70.130**

**Powers and duties of secretary -- General.**

The secretary of health shall:

(1) – (8) (MATERIAL OMMITTED)

(9) Review and approve plans for public water system design, engineering, operation, maintenance, financing, and emergency response, as required under state board of health rules;

(10) – (11) (MATERIAL OMMITTED)

[1990 c 132 § 2; 1989 1st ex.s. c 9 § 251; 1985 c 213 § 2; 1979 c 141 § 46; 1967 ex.s. c 102 § 1; 1965 c 8 § 43.20.010. Prior: (i) 1909 c 208 § 2; RRS § 6004. (ii) 1921 c 7 § 59; RRS § 10817. Formerly RCW 43.20A.600 and 43.20.010.]

**RCW 87.03.140**

**Board's powers and duties generally -- Condemnation procedure.**

The board, and its agents and employees, shall have the right to enter upon any land to make surveys, and may locate the necessary irrigation or drainage works, power plants, power sites or power lines and the line for any canal or canals, and the necessary branches of laterals for the same, on any lands which may be deemed best for such location. Said board shall also have the power to acquire, either by purchase or condemnation, or other legal means, all lands, waters, water rights, and other property necessary for the construction, use, supply, maintenance, repair and improvements of said canal or canals and irrigation and drainage works, including canals and works constructed or being constructed by private owners, or any other person, lands for reservoirs for the storage of needful waters and all necessary appurtenances. The board may also construct the necessary dams, reservoirs and works for the collection of water for the said district, and may enter into contracts for a water supply to be delivered to the canals and works of

the district, and do any and every lawful act necessary to be done in order to carry out the purposes of this act; and in carrying out the aforesaid purposes the bonds of the district may be used by the board, at not less than ninety percent of their par value in payment. The board may enter into any obligation or contract with the United States or with the state of Washington for the supervision of the construction, for the construction, reconstruction, betterment, extension, sale or purchase, or operation and maintenance of the necessary works for the delivery and distribution of water therefrom under the provisions of the state reclamation act, or under the provisions of the federal reclamation act, and all amendments or extensions thereof, and the rules and regulations established thereunder, or it may contract with the United States for a water supply or for reclamation purposes in general under any act of congress which, for the purposes of this act, shall be deemed to include any act of congress for reclamation purposes heretofore or hereafter enacted providing for and permitting such contract, or for the collection of money due or to become due to the United States, or for the assumption of the control and management of the works; and in case contract has been or may hereafter be made with the United States, as herein provided, bonds of the district may be deposited with the United States as payment or as security for future payment at not less than ninety percent of their par value, the interest on said bonds to be provided for by assessment and levy as in the case of other bonds of the district, and regularly paid to the United States to be applied as provided in such contract, and if bonds of the district are not so deposited, it shall be the duty of the board of directors to include as part of any levy or assessment provided in RCW 87.03.260 an amount sufficient to meet each year all payments accruing under the terms of any such contract. The board may accept on behalf of the district appointment of the district as fiscal agent of the United States or the state of Washington or other authorization of the district by the United States or the state of Washington to make collections of money for or on behalf of the United States or the state of Washington in connection with any federal or other reclamation project, whereupon the district, and the county treasurer for the district, shall be authorized to so act and to assume the duties and liability incident to such action, and the said board shall have full power to do any and all things required by the federal statutes now or hereafter enacted in connection therewith, and all things required by the rules and regulations now or that may hereafter be established by any department of the federal government in regard thereto.

The use of all water required for the irrigation of the lands within any district, together with rights-of-way for canals, laterals, ditches, sites for reservoirs, power plants, sites, and lines, and all other property required in fully carrying out the purposes of the organization of the district is hereby declared to be a public use; and in condemnation proceedings to acquire any property or property rights for the use of the district, the board of directors shall proceed in the name of the district, in the manner provided in this state in cases of appropriation of lands, real estate and other property by private corporations: PROVIDED, That the irrigation district, at its option, pursuant to resolution to that end duly passed by its board of directors may unite in a single action proceedings for the acquisition and condemnation of different tracts of land needed by it for rights-of-way for canals, laterals, power plants, sites, and lines and other irrigation works which are held by separate owners. And the court may, on the motion of any party, consolidate into a single action separate suits for the condemnation of rights-of-way for such irrigation works whenever from motives of economy or the expediting of business it appears desirable so to do: PROVIDED FURTHER, That there shall be a separate finding of the court or jury as to each tract held in separate ownership.

In any condemnation proceeding brought under the provisions of this act to acquire canals, laterals and ditches and rights-of-way therefor, sites, reservoirs, power plants and pumping plants and sites therefor, power canals, transmission lines, electrical equipment and any other property, and if the owner or owners thereof or their predecessors shall have issued contracts or deeds agreeing to deliver to the holders of said contracts or deeds water for irrigation purposes, or authorizing the holders thereof to take or receive water for irrigation purposes from any portion of said property or works, and if the delivery of said water or the right to take or receive the same shall in any manner constitute a charge upon, or a right in the property and works sought to be acquired, or any portion thereof, the district shall be authorized to institute and maintain said condemnation proceedings for the purpose of acquiring said property and works, and the interest of the owners therein subject to the rights of the holders of such contracts or deeds, and the court or jury making the award shall determine and award to such owner or owners the value of the interest to be so appropriated in said condemnation proceedings.
[1921 c 129 § 6; 1919 c 180 § 5; 1915 c 179 § 5; 1913 c 165 § 6; 1913 c 13 § 1; 1889-90 p 678 § 12; RRS § 7429. Formerly RCW 87.01.210, part and 87.08.080.]

**RCW 87.84.061**
**Directors -- Additional powers.**
The water in any natural or impounded lake, wholly or partially within the boundaries of an irrigation and rehabilitation district, together with all use of said water and the bottom and shore lines to the line established by the highest level where water has been or shall be stored in said lake, shall be regulated, controlled and used by the irrigation and rehabilitation district in order to further the health, safety, recreation and welfare of the residents in the district and the citizens and guests of the state of Washington, subject to rights of the United States bureau of reclamation and any irrigation districts organized under the laws of the state of Washington.

In addition to the powers expressly or impliedly enumerated above, the directors of an irrigation and rehabilitation district shall have the power and authority to:

(1) – (6) (MATERIAL OMMITTED)

(7) Except for state highways, construct, maintain, place, and/or restore roads, buildings, docks, dams, canals, locks, mechanical lifts or any other type of transportation facility; dredge, purchase land, or lease land, or enter into agreements with other agencies or conduct any other activity within or without the district boundaries in order to carry out district projects or activities to further the recreational potential of the area.
[1994 c 264 § 79; 1988 c 127 § 69; 1979 c 141 § 383; 1963 c 221 § 5.]

**RCW 89.08.220**
**Corporate status and powers of district.**
A conservation district organized under the provisions of chapter 184, Laws of 1973 1st ex. sess. shall constitute a governmental subdivision of this state, and a public body corporate and politic exercising public powers, but shall not levy taxes or issue bonds and such district, and the supervisors thereof, shall have the following powers, in addition to others granted in other sections of chapter 184, Laws of 1973 1st ex. sess.:

(1) – (6) (MATERIAL OMMITTED)

(7) To prepare and keep current a comprehensive long-range program recommending the conservation of all the renewable natural resources of the district. Such programs shall be directed toward the best use of renewable natural resources and in a manner that will best meet the needs of the district and the state, taking into consideration, where appropriate, such

uses as farming, grazing, timber supply, forest, parks, outdoor recreation, potable water supplies for urban and rural areas, water for agriculture, minimal flow, and industrial uses, watershed stabilization, control of soil erosion, retardation of water run-off, flood prevention and control, reservoirs and other water storage, restriction of developments of flood plains, protection of open space and scenery, preservation of natural beauty, protection of fish and wildlife, preservation of wilderness areas and wild rivers, the prevention or reduction of sedimentation and other pollution in rivers and other waters, and such location of highways, schools, housing developments, industries, airports and other facilities and structures as will fit the needs of the state and be consistent with the best uses of the renewable natural resources of the state. The program shall include an inventory of all renewable natural resources in the district, a compilation of current resource needs, projections of future resource requirements, priorities for various resource activities, projected timetables, descriptions of available alternatives, and provisions for coordination with other resource programs.

The district shall also prepare an annual work plan, which shall describe the action programs, services, facilities, materials, working arrangements and estimated funds needed to carry out the parts of the long-range programs that are of the highest priorities.

The districts shall hold public hearings at appropriate times in connection with the preparation of programs and plans, shall give careful consideration to the views expressed and problems revealed in hearings, and shall keep the public informed concerning their programs, plans, and activities. Occupiers of land shall be invited to submit proposals for consideration to such hearings. The districts may supplement such hearings with meetings, referenda and other suitable means to determine the wishes of interested parties and the general public in regard to current and proposed plans and programs of a district. They shall confer with public and private agencies, individually and in groups, to give and obtain information and understanding of the impact of district operations upon agriculture, forestry, water supply and quality, flood control, particular industries, commercial concerns and other public and private interests, both rural and urban.

Each district shall submit to the commission its proposed long-range program and annual work plans for review and comment.

The long-range renewable natural resource program, together with the supplemental annual work plans, developed by each district under the foregoing procedures shall have official status as the authorized program of the district, and it shall be published by the districts as its "renewable resources program". Copies shall be made available by the districts to the appropriate counties, municipalities, special purpose districts and state agencies, and shall be made available in convenient places for examination by public land occupier or private interest concerned. Summaries of the program and selected material therefrom shall be distributed as widely as feasible for public information;

(8) - (14) (MATERIAL OMMITTED)

[1999 c 305 § 8; 1973 1st ex.s. c 184 § 23; 1963 c 110 § 1; 1961 c 240 § 13; 1955 c 304 § 23. Prior: (i) 1939 c 187 § 8; RRS § 10726-8. (ii) 1939 c 187 § 13; RRS § 10726-13.]

**RCW 90.40.010**

**Eminent domain by the United States.**

The United States is hereby granted the right to exercise the power of eminent domain to acquire the right to the use of any water, to acquire or extinguish any rights, and to acquire any lands or other property, for the construction, operation, repairs to, maintenance or control of any plant or

system of works for the storage, conveyance, or use of water for irrigation purposes, and whether such water, rights, lands or other property so to be acquired belong to any private party, association, corporation or to the state of Washington, or any municipality thereof; and such power of eminent domain shall be exercised under and by the same procedure as now is or may be hereafter provided by the law of this state for the exercise of the right of eminent domain by ordinary railroad corporations, except that the United States may exercise such right in the proper court of the United States as well as the proper state court.
[1905 c 88 § 1; RRS § 7408.]

**RCW 90.40.020**
**Right to use water courses.**
The United States shall have the right to turn into any natural or artificial water course, any water that it may have acquired the right to store, divert, or store and divert, and may again divert and reclaim said waters from said water course for irrigation purposes subject to existing rights.
[1905 c 88 § 2; RRS § 7409.]

**RCW 90.40.040**
**Appropriation of water -- Title to beds and shores.**
Whenever said secretary of the interior or other duly authorized officer of the United States shall cause to be let a contract for the construction of any irrigation works or any works for the storage of water for use in irrigation, or any portion or section thereof, for which the withdrawal has been effected as provided in RCW 90.40.030, any authorized officer of the United States, either in the name of the United States or in such name as may be determined by the secretary of the interior, may appropriate, in behalf of the United States, so much of the unappropriated waters of the state as may be required for the project, or projects, for which water has been withdrawn or reserved under RCW 90.40.030, including any and all divisions thereof, theretofore constructed, in whole or in part, by the United States or proposed to be thereafter constructed by the United States, such appropriation to be made, maintained and perfected in the same manner and to the same extent as though such appropriation had been made by a private person, corporation or association, except that the date of priority as to all rights under such appropriation in behalf of the United States shall relate back to the date of the first withdrawal or reservation of the waters so appropriated, and in case of filings on water previously withdrawn under RCW 90.40.030, no payment of fees will be required. Such appropriation by or on behalf of the United States shall inure to the United States, and its successors in interest, in the same manner and to the same extent as though said appropriation had been made by a private person, corporation or association. The title to the beds and shores of any navigable lake or stream utilized by the construction of any reservoir or other irrigation works created or constructed as a part of such appropriation hereinbefore in this section provided for, shall vest in the United States to the extent necessary for the maintenance, operation and control of such reservoir or other irrigation works.
[1929 c 95 § 1; 1905 c 88 § 4; RRS § 7411.]

## *PLANNING AUTHORITIES*

RCW 43.21A.350
Master plan of development.
The department of ecology shall prepare and perfect from time to time a state master plan for flood control, state public reservations, financed in whole or in part from moneys collected by the state, sites for state public buildings and for the orderly development of the natural and agricultural resources of the state. The plan shall address how the department will expedite the completion of industrial projects of state-wide significance. The plan shall be a guide in making recommendations to the officers, boards, commissions, and departments of the state.

Whenever an improvement is proposed to be established by the state, the state agency having charge of the establishment thereof shall request of the director a report thereon, which shall be furnished within a reasonable time thereafter. In case an improvement is not established in conformity with the report, the state agency having charge of the establishment thereof shall file in its office and with the department a statement setting forth its reasons for rejecting or varying from such report which shall be open to public inspection.

The department shall insofar as possible secure the cooperation of adjacent states, and of counties and municipalities within the state in the coordination of their proposed improvements with such master plan.
[1997 c 369 § 6; 1987 c 109 § 29; 1965 c 8 § 43.21.190. Prior: 1957 c 215 § 22; 1933 ex.s. c 54 § 3; RRS § 10930-3. Formerly RCW 43.21.190.]

**RCW 70.116.030**
**Definitions.**
Unless the context clearly requires otherwise, the following terms when used in this chapter shall be defined as follows:

(1) "Coordinated water system plan" means a plan for public water systems within a critical water supply service area which identifies the present and future needs of the systems and sets forth means for meeting those needs in the most efficient manner possible. Such a plan shall include provisions for subsequently updating the plan. In areas where more than one water system exists, a coordinated plan may consist of either: (a) A new plan developed for the area following its designation as a critical water supply service area; or (b) a compilation of compatible water system plans existing at the time of such designation and containing such supplementary provisions as are necessary to satisfy the requirements of this chapter. Any such coordinated plan must include provisions regarding: Future service area designations; assessment of the feasibility of shared source, transmission, and storage facilities; emergency inter-ties; design standards; and other concerns related to the construction and operation of the water system facilities.

(2) "Critical water supply service area" means a geographical area which is characterized by a proliferation of small, inadequate water systems, or by water supply problems which threaten the present or future water quality or reliability of service in such a manner that efficient and orderly development may best be achieved through coordinated planning by the water utilities in the area.

(3) "Public water system" means any system providing water intended for, or used for, human consumption or other domestic uses. It includes, but is not limited to, the source, treatment for purifying purposes only, storage, transmission, pumping, and distribution facilities where water is furnished to any community, or number of individuals, or is made available to the public for human consumption or domestic use, but excluding water systems

serving one single family residence. However, systems existing on September 21, 1977 which are owner operated and serve less than ten single family residences or which serve only one industrial plant shall be excluded from this definition and the provisions of this chapter.

(4) – (6) (MATERIAL OMMITTED)

[1991 c 3 § 366; 1977 ex.s. c 142 § 3.]

**RCW 90.82.070**

**Water quantity component.**

Watershed planning under this chapter shall address water quantity in the management area by undertaking an assessment of water supply and use in the management area and developing strategies for future use.

(1) The assessment shall include:

(a) An estimate of the surface and ground water present in the management area;

(b) An estimate of the surface and ground water available in the management area, taking into account seasonal and other variations;

(c) An estimate of the water in the management area represented by claims in the water rights claims registry, water use permits, certificated rights, existing minimum instream flow rules, federally reserved rights, and any other rights to water;

(d) An estimate of the surface and ground water actually being used in the management area;

(e) An estimate of the water needed in the future for use in the management area;

(f) An identification of the location of areas where aquifers are known to recharge surface bodies of water and areas known to provide for the recharge of aquifers from the surface; and

(g) An estimate of the surface and ground water available for further appropriation, taking into account the minimum instream flows adopted by rule or to be adopted by rule under this chapter for streams in the management area including the data necessary to evaluate necessary flows for fish.

(2) Strategies for increasing water supplies in the management area, which may include, but are not limited to, increasing water supplies through water conservation, water reuse, the use of reclaimed water, voluntary water transfers, aquifer recharge and recovery, additional water allocations, or additional water storage and water storage enhancements. The objective of these strategies is to supply water in sufficient quantities to satisfy the minimum instream flows for fish and to provide water for future out-of-stream uses for water identified in subsection (1)(e) and (g) of this section and to ensure that adequate water supplies are available for agriculture, energy production, and population and economic growth under the requirements of the state's growth management act, chapter 36.70A RCW. These strategies, in and of themselves, shall not be construed to confer new water rights. The watershed plan must address the strategies required under this subsection.

[1998 c 247 § 3.]

**RCW 36.70A.020**

**Planning goals.**

The following goals are adopted to guide the development and adoption of comprehensive plans and development regulations of those counties and cities that are required or choose to plan under RCW 36.70A.040. The following goals are not listed in order of priority and shall be used exclusively for the purpose of guiding the development of comprehensive plans and development regulations:

**(1) – (9) (MATERIAL OMMITTED)**

(10) Environment. Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water.

(11) – (12) (MATERIAL OMMITTED)

[1990 1st ex.s. c 17 § 2.]

## RIGHTS

**RCW 90.03.040**

**Eminent domain -- Use of water declared public use.**

The beneficial use of water is hereby declared to be a public use, and any person may exercise the right of eminent domain to acquire any property or rights now or hereafter existing when found necessary for the storage of water for, or the application of water to, any beneficial use, including the right to enlarge existing structures employed for the public purposes mentioned in this chapter and use the same in common with the former owner, and including the right and power to condemn an inferior use of water for a superior use. In condemnation proceedings the court shall determine what use will be for the greatest public benefit, and that use shall be deemed a superior one: PROVIDED, That no property right in water or the use of water shall be acquired hereunder by condemnation for irrigation purposes, which shall deprive any person of such quantity of water as may be reasonably necessary for the irrigation of his land then under irrigation to the full extent of the soil, by the most economical method of artificial irrigation applicable to such land according to the usual methods of artificial irrigation employed in the vicinity where such land is situated. In any case, the court shall determine what is the most economical method of irrigation. Such property or rights shall be acquired in the manner provided by law for the taking of private property for public use by private corporations.

[1917 c 117 § 4; RRS § 7354. Formerly RCW 90.04.030.]

**RCW 90.16.020**

**Appropriation for industrial purposes.**

Any person or persons, or company now incorporated, or that may hereafter become incorporated under the laws of this state, for the purpose of mining or manufacturing, shall have the right to purchase or appropriate and take possession of and divert from its natural channel, and use and hold the waters of any river, creek or stream in this state that may be required for the mining and manufacturing purposes of any such person or persons, corporation or corporations, and to construct all dams, canals, reservoirs, ditches, pipes, flumes and aqueducts, suitable and necessary for the controlling, directing and running such waters to their mines or manufacturing establishments of any such person or persons, corporation or corporations, where the same may be intended to be utilized for such purposes: PROVIDED, That no such appropriation or diversion of the waters of any such river, creek, or stream, from its natural channel; nor shall any such dam, canal, reservoir, ditch, pipe, flume or aqueduct, be constructed to the detriment of any person or persons, corporation or corporations, occupying the lands or being located below the point or place of such appropriation or diversion on any such stream or its tributaries, or above or below such dam, canal, reservoir, ditch, pipe, flume or aqueduct, or of the owners of the lands, through which the waters run in the natural course for the deprivation of the same, or the owners of the land through or upon which such dam, canal, reservoirs, ditch, pipe, flume or aqueduct, may pass through or over, or be situated upon, unless just and adequate compensation be previously ascertained and paid therefor.

[Code 1881 Bagley's Supp. p 36 § 1; 1879 p 124 § 1; RRS § 11575.]

**RCW 90.28.170**
**Dams across streams.**
There is hereby granted to persons, firms and corporations organized among other things, for irrigation and power purposes, the right to construct and maintain dams and works incident thereto over, upon and across the beds of the rivers of the state of Washington in connection with such power and irrigation purposes, and there is hereby granted to such persons, firms and corporations an easement over, upon and across the beds of such rivers for such purposes. Such easement shall be limited however, to so much of the beds of such rivers as may be reasonably convenient and necessary for such uses. All such dams and works shall be completed within five years after the commencement of construction work upon the same. The rights and privileges granted by this section shall inure to the benefit of such persons, firms or corporations from the date of the commencement of construction work upon such dams and works incident thereto, and such construction work shall be diligently prosecuted to completion, and the rights, privileges and easements granted by this section shall continue so long as the same shall be utilized by the grantees for the purposes herein specified, and the failure to maintain and use such dams and works after the same shall have been constructed, for a continuous period of two years, shall operate as a forfeiture of all the rights hereby granted and the same shall revert to the state of Washington: PROVIDED, That nothing in this section shall be construed in such a way as to interfere with the use of said rivers for navigation purposes, and all of such rights, privileges and easements granted hereby shall be subject to the paramount control of such rivers for navigation purposes by the United States: AND, PROVIDED FURTHER, That the use and enjoyment of the grants and privileges of this section shall not interfere with the lawful and rightful diversion of the waters of said rivers by other parties under water appropriations in existence at the time any such persons, firms or corporations shall avail themselves of the benefits and privileges of this section, but no such persons, firms or corporations shall have any right to construct any such dams or works over, upon or across the land between ordinary high water and extreme low water of any river of this state without first having acquired the right to do so from the owner or owners of the lands adjoining the land between ordinary high water and extreme low water over or across which said dam or works are constructed. [1911 c 95 § 1; RRS § 7416.]

**RCW 90.44.130**
**Priorities as between appropriators -- Department in charge of ground water withdrawals -- Establishment and modification of ground water areas and depth zones -- Declarations by claimant of artificially stored water.**
(MATERIAL OMMITTED)
Within ninety days after the designation of a ground water area, sub-area or zone as herein provided, any person, firm or corporation then claiming to be the owner of artificially stored ground water within such area, sub-area, or zone shall file a certified declaration to that effect with the department on a form prescribed by the department. Such declaration shall cover: (1) The location and description of the works by whose operation such artificial ground water storage is purported to have been created, and the name or names of the owner or owners thereof; (2) a description of the lands purported to be underlain by such artificially stored ground water, and the name or names of the owner or owners thereof; (3) the amount of such water claimed; (4) the date or approximate date of the earliest artificial storage; (5) evidence competent to show that the water claimed is in fact water that would have been dissipated naturally except for artificial improvements by the claimant; and (6) such additional factual information as reasonably may be required by the department. If any of the purported artificially stored ground water has

been or then is being withdrawn, the claimant also shall file (1) the declarations which this chapter requires of claimants to a vested right to withdraw public ground waters, and (2) evidence competent to show that none of the water withdrawn under those declarations is in fact public ground water from the area, sub-area, or zone concerned: PROVIDED, HOWEVER, That in case of failure to file a declaration within the ninety-day period herein provided, the claimant may apply to the department for a reasonable extension of time, which shall not exceed two additional years and which shall be granted only upon a showing of good cause for such failure.

Following publication of the declaration and findings -- as in the case of an original application, permit, or certificate of right to appropriate public ground waters -- the department shall accept or reject such declaration or declarations with respect to ownership or withdrawal of artificially stored ground water. Acceptance of such declaration or declarations by the department shall convey to the declarant no right to withdraw public ground waters from the particular area, sub-area, or zone, nor to impair existing or subsequent rights to such public waters.

Any person, firm or corporation hereafter claiming to be the owner of ground water within a designated ground water area, sub-area, or zone by virtue of its artificial storage subsequent to such designation shall, within three years following the earliest artificial storage file a declaration of claim with the department, as herein prescribed for claims based on artificial storage prior to such designation: PROVIDED, HOWEVER, That in case of such failure the claimant may apply to the department for a reasonable extension of time, which shall not exceed two additional years and which shall be granted upon a showing of good cause for such failure.

Any person, firm or corporation hereafter withdrawing ground water claimed to be owned by virtue of artificial storage subsequent to designation of the relevant ground water area, sub-area, or zone shall, within ninety days following the earliest such withdrawal, file with the department the declarations required by this chapter with respect to withdrawals of public ground water.

[1987 c 109 § 116; 1947 c 122 § 4; 1945 c 263 § 12; Rem. Supp. 1947 § 7400-12. Formerly RCW 90.44.130 through 90.44.170.]

**RCW 90.54.900**

**Certain rights, authority, not to be affected by chapter.**

Nothing in this chapter shall affect any existing water rights, riparian, appropriative, or otherwise; nor shall it affect existing rights relating to the operation of any hydroelectric or water storage reservoir or related facility; nor shall it affect any exploratory work, construction or operation of a thermal power plant by an electric utility in accordance with the provisions of chapter 80.50 RCW. Nothing in this chapter shall enlarge or reduce the department of ecology's authority to regulate the surface use of waters of this state or structures on the underlying beds, tidelands or shorelands.

[1971 ex.s. c 225 § 9.]

RCW 90.54.920

Rights not impaired.

**(relates only to the 1989 amendments to RCW 90.54.020)**

(1) Nothing in this act shall affect or operate to impair any existing water rights.

(2) Nothing in this act shall be used to prevent future storage options, recognizing that storage may be necessary as a method of conserving water to meet both instream and out-of-stream needs.

(3) Nothing in this act shall infringe upon the rate-making prerogatives of any public water purveyor.

(4) Nothing in this act shall preclude the joint select committee on water resource policy from reviewing any subject matter contained herein for any future modifications.

[1989 c 348 § 3.]

**RCW 90.03.400**
**Crimes against water code -- Unauthorized use of water.**
The unauthorized use of water to which another person is entitled or the wilful or negligent waste of water to the detriment of another, shall be a misdemeanor. The possession or use of water without legal right shall be prima facie evidence of the guilt of the person using it. It shall also be a misdemeanor to use, store or divert any water until after the issuance of permit to appropriate such water.
[1917 c 117 § 40; RRS § 7392. Formerly RCW 90.32.010.]

**RCW 43.21A.068**
**Federal power act licensees -- Exemption from state requirements.**
(1) With respect to the safety of any dam, canal, ditch, hydraulic power plant, reservoir, project, or other work, system, or plant that requires a license under the federal power act, no licensee shall be required to:

(a) Submit proposals, plans, specifications, or other documents for approval by the department;

(b) Seek a permit, license, or other form, permission, or authorization from the department;

(c) Submit to inspection by the department; or

(d) Change the design, construction, modification, maintenance, or operation of such facilities at the demand of the department.

(2) For the purposes of this section, "licensee" means an owner or operator, or any employee thereof, of a dam, canal, ditch, hydraulic power plant, reservoir, project, or other work, system, or plant that requires a license under the federal power act.

RCW 90.03.255
Applications for water right, transfer, or change -- Consideration of water impoundment or other resource management technique.
The department shall, when evaluating an application for a water right, transfer, or change filed pursuant to RCW 90.03.250 or 90.03.380 that includes provision for any water impoundment or other resource management technique, take into consideration the benefits and costs, including environmental effects, of any water impoundment or other resource management technique that is included as a component of the application. The department's consideration shall extend to any increased water supply that results from the impoundment or other resource management technique, including but not limited to any recharge of ground water that may occur, as a means of making water available or otherwise offsetting the impact of the diversion of surface water proposed in the application for the water right, transfer, or change. Provision for an impoundment or other resource management technique in an application shall be made solely at the discretion of the applicant and shall not otherwise be made by the department as a condition for approving an application that does not include such provision.

This section does not lessen, enlarge, or modify the rights of any riparian owner, or any existing water right acquired by appropriation or otherwise.
[1997 c 360 § 2; 1996 c 306 § 1.]

**RCW 90.44.055**
**Applications for water right or amendment -- Consideration of water impoundment or other resource management technique.**

The department shall, when evaluating an application for a water right or an amendment filed pursuant to RCW 90.44.050 or 90.44.100 that includes provision for any water impoundment or other resource management technique, take into consideration the benefits and costs, including environmental effects, of any water impoundment or other resource management technique that is included as a component of the application. The department's consideration shall extend to any increased water supply that results from the impoundment or other resource management technique, including but not limited to any recharge of ground water that may occur, as a means of making water available or otherwise offsetting the impact of the withdrawal of ground water proposed in the application for the water right or amendment in the same water resource inventory area. Provision for an impoundment or other resource management technique in an application shall be made solely at the discretion of the applicant and shall not be made by the department as a condition for approving an application that does not include such provision.

This section does not lessen, enlarge, or modify the rights of any riparian owner, or any existing water right acquired by appropriation or otherwise.

[1997 c 360 § 3; 1996 c 306 § 2.]

**RCW 90.03.260**

**Appropriation procedure -- Application -- Contents.**

Each application for permit to appropriate water shall set forth the name and post office address of the applicant, the source of water supply, the nature and amount of the proposed use, the time during which water will be required each year, the location and description of the proposed ditch, canal, or other work, the time within which the completion of the construction and the time for the complete application of the water to the proposed use. If for agricultural purposes, it shall give the legal subdivision of the land and the acreage to be irrigated, as near as may be, and the amount of water expressed in acre feet to be supplied per season. If for power purposes, it shall give the nature of the works by means of which the power is to be developed, the head and amount of water to be utilized, and the uses to which the power is to be applied. If for construction of a reservoir, it shall give the height of the dam, the capacity of the reservoir, and the uses to be made of the impounded waters. If for municipal water supply, it shall give the present population to be served, and, as near as may be, the future requirement of the municipality. If for mining purposes, it shall give the nature of the mines to be served and the method of supplying and utilizing the water; also their location by legal subdivisions. All applications shall be accompanied by such maps and drawings, in duplicate, and such other data, as may be required by the department, and such accompanying data shall be considered as a part of the application.

[1987 c 109 § 84; 1917 c 117 § 28; RRS § 7379. Formerly RCW 90.20.020.]

**RCW 90.03.350**

**Construction or modification of storage dam -- Plans and specifications -- Additional dam safety inspection requirements for metals mining and milling operations.**

Except as provided in RCW 43.21A.068, any person, corporation or association intending to construct or modify any dam or controlling works for the storage of ten acre feet or more of water, shall before beginning said construction or modification, submit plans and specifications of the same to the department for examination and approval as to its safety. Such plans and specifications shall be submitted in duplicate, one copy of which shall be retained as a public record, by the department, and the other returned with its approval or rejection endorsed thereon. No such dam or controlling works shall be constructed or modified until the same or any modification thereof

shall have been approved as to its safety by the department. Any such dam or controlling works constructed or modified in any manner other than in accordance with plans and specifications approved by the department or which shall not be maintained in accordance with the order of the department shall be presumed to be a public nuisance and may be abated in the manner provided by law, and it shall be the duty of the attorney general or prosecuting attorney of the county wherein such dam or controlling works, or the major portion thereof, is situated to institute abatement proceedings against the owner or owners of such dam or controlling works, whenever he or she is requested to do so by the department.

A metals mining and milling operation regulated under chapter 232, Laws of 1994 is subject to additional dam safety inspection requirements due to the special hazards associated with failure of a tailings pond impoundment. The department shall inspect these impoundments at least quarterly during the project's operation and at least annually thereafter for the postclosure monitoring period in order to ensure the safety of the dam or controlling works. The department shall conduct additional inspections as needed during the construction phase of the mining operation in order to ensure the safe construction of the tailings impoundment.
[1995 c 8 § 6; 1994 c 232 § 20; 1987 c 109 § 91; 1955 c 362 § 1; 1939 c 107 § 1; 1917 c 117 § 36; RRS § 7388. Formerly RCW 90.28.060.] [1954 SLC-RO-18.]

**RCW 90.03.360**
**Controlling works and measuring devices -- Metering of diversions -- Impact on fish stock.**

(1) The owner or owners of any water diversion shall maintain, to the satisfaction of the department of ecology, substantial controlling works and a measuring device constructed and maintained to permit accurate measurement and practical regulation of the flow of water diverted. Every owner or manager of a reservoir for the storage of water shall construct and maintain, when required by the department, any measuring device necessary to ascertain the natural flow into and out of said reservoir.

Metering of diversions or measurement by other approved methods shall be required as a condition for all new surface water right permits, and except as provided in subsection (2) of this section, may be required as a condition for all previously existing surface water rights. The department may also require, as a condition for all water rights, metering of diversions, and reports regarding such metered diversions as to the amount of water being diverted. Such reports shall be in a form prescribed by the department.

(2) Where water diversions are from waters in which the salmonid stock status is depressed or critical, as determined by the department of fish and wildlife, or where the volume of water being diverted exceeds one cubic foot per second, the department shall require metering or measurement by other approved methods as a condition for all new and previously existing water rights or claims. The department shall attempt to integrate the requirements of this subsection into its existing compliance workload priorities, but shall prioritize the requirements of this subsection ahead of the existing compliance workload where a delay may cause the decline of wild salmonids. The department shall notify the department of fish and wildlife of the status of fish screens associated with these diversions.

This subsection (2) shall not apply to diversions for public or private hatcheries or fish rearing facilities if the diverted water is returned directly to the waters from which it was diverted.
[1994 c 264 § 85; 1993 sp.s. c 4 § 12; 1989 c 348 § 6; 1987 c 109 § 92; 1917 c 117 § 37; RRS § 7389. Formerly RCW 90.28.070.]

**RCW 90.03.370**
**Reservoir permits -- Secondary permits -- Underground artificial storage and recovery project standards and rules -- Report to the legislature.**

(1) All applications for reservoir permits shall be subject to the provisions of RCW 90.03.250 through 90.03.320. But the party or parties proposing to apply to a beneficial use the water stored in any such reservoir shall also file an application for a permit, to be known as the secondary permit, which shall be in compliance with the provisions of RCW 90.03.250 through 90.03.320. Such secondary application shall refer to such reservoir as its source of water supply and shall show documentary evidence that an agreement has been entered into with the owners of the reservoir for a permanent and sufficient interest in said reservoir to impound enough water for the purposes set forth in said application. When the beneficial use has been completed and perfected under the secondary permit, the department shall take the proof of the water users under such permit and the final certificate of appropriation shall refer to both the ditch and works described in the secondary permit and the reservoir described in the primary permit.

(2)(a) For the purposes of this section, "reservoir" includes, in addition to any surface reservoir, any naturally occurring underground geological formation where water is collected and stored for subsequent use as part of an underground artificial storage and recovery project. To qualify for issuance of a reservoir permit an underground geological formation must meet standards for review and mitigation of adverse impacts identified, for the following issues:

(i) Aquifer vulnerability and hydraulic continuity;
(ii) Potential impairment of existing water rights;
(iii) Geotechnical impacts and aquifer boundaries and characteristics;
(iv) Chemical compatibility of surface waters and ground water;
(v) Recharge and recovery treatment requirements;
(vi) System operation;
(vii) Water rights and ownership of water stored for recovery; and
(viii) Environmental impacts.

(b) Standards for review and standards for mitigation of adverse impacts for an underground artificial storage and recovery project shall be established by the department by rule. Notwithstanding the provisions of RCW 90.03.250 through 90.03.320, analysis of each underground artificial storage and recovery project and each underground geological formation for which an applicant seeks the status of a reservoir shall be through applicant-initiated studies reviewed by the department.

(3) For the purposes of this section, "underground artificial storage and recovery project" means any project in which it is intended to artificially store water in the ground through injection, surface spreading and infiltration, or other department-approved method, and to make subsequent use of the stored water. However, (a) this subsection does not apply to irrigation return flow, or to operational and seepage losses that occur during the irrigation of land, or to water that is artificially stored due to the construction, operation, or maintenance of an irrigation district project, or to projects involving water reclaimed in accordance with chapter 90.46 RCW; and (b) RCW 90.44.130 applies to those instances of claimed artificial recharge occurring due to the construction, operation, or maintenance of an irrigation district project or operational and seepage losses that occur during the irrigation of land, as well as other forms of claimed artificial recharge already existing at the time a ground water subarea is established.

(4) Nothing in chapter 98, Laws of 2000 changes the requirements of existing law governing issuance of permits to appropriate or withdraw the waters of the state.

(5) The department shall report to the legislature by December 31, 2001, on the standards for review and standards for mitigation developed under subsection (3) of this section and on the status of any applications that have been filed with the department for underground artificial storage and recovery projects by that date.
[2000 c 98 § 3; 1987 c 109 § 93; 1917 c 117 § 38; RRS § 7390. Formerly RCW 90.28.080.]

**RCW 90.44.035**
**Definitions.**
For purposes of this chapter:
(1) "Department" means the department of ecology;
(2) "Director" means the director of ecology;
(3) "Ground waters" means all waters that exist beneath the land surface or beneath the bed of any stream, lake or reservoir, or other body of surface water within the boundaries of this state, whatever may be the geological formation or structure in which such water stands or flows, percolates or otherwise moves. There is a recognized distinction between natural ground water and artificially stored ground water;
(4) "Natural ground water" means water that exists in underground storage owing wholly to natural processes;
(5) "Artificially stored ground water" means water that is made available in underground storage artificially, either intentionally, or incidentally to irrigation and that otherwise would have been dissipated by natural processes; and
(6) "Underground artificial storage and recovery project" means any project in which it is intended to artificially store water in the ground through injection, surface spreading and infiltration, or other department-approved method, and to make subsequent use of the stored water. However, (a) this subsection does not apply to irrigation return flow, or to operational and seepage losses that occur during the irrigation of land, or to water that is artificially stored due to the construction, operation, or maintenance of an irrigation district project, or to projects involving water reclaimed in accordance with chapter 90.46 RCW; and (b) RCW 90.44.130 applies to those instances of claimed artificial recharge occurring due to the construction, operation, or maintenance of an irrigation district project or operational and seepage losses that occur during the irrigation of land, as well as other forms of claimed artificial recharge already existing at the time a ground water subarea is established.
[2000 c 98 § 2; 1987 c 109 § 107; 1973 c 94 § 2; 1945 c 263 § 3; RRS § 7400-3. Formerly RCW 90.44.010.]

**RCW 90.03.470**
**Schedule of fees.**
Except as otherwise provided in subsection (15) of this section, the following fees shall be collected by the department in advance:
(1) For the examination of an application for permit to appropriate water or on application to change point of diversion, withdrawal, purpose or place of use, a minimum of ten dollars, to be paid with the application. For each second foot between one and five hundred second feet, two dollars per second foot; for each second foot between five hundred and two thousand second feet, fifty cents per second foot; and for each second foot in excess thereof, twenty cents per second foot. For each acre foot of storage up to and including one hundred thousand acre feet, one cent per acre foot, and for each acre foot in excess thereof, one-fifth cent per acre foot. The ten dollar fee payable with the application shall be a credit to that amount whenever the fee for direct diversion or storage totals more than ten dollars

under the above schedule and in such case the further fee due shall be the total computed amount less ten dollars.

(2) – (7) (MATERIAL OMMITTED)

(8) For the inspection of any hydraulic works to insure safety to life and property, the actual cost of the inspection, including the expense incident thereto.

(9) For the examination of plans and specifications as to safety of controlling works for storage of ten acre feet or more of water, a minimum fee of ten dollars, or the actual cost.

**RCW 90.16.050**
**Schedule of fees for claimants of water power.**

Every person, firm, private or municipal corporation, or association hereinafter called "claimant", claiming the right to the use of water within or bordering upon the state of Washington for power development, shall on or before the first day of July, 1929, and on or before the first day of January of each year thereafter pay to the state of Washington in advance an annual license fee, based upon the theoretical water power claimed under each and every separate claim to water according to the following schedule:

For projects in operation: For each and every theoretical horsepower claimed up to and including one thousand horsepower, at the rate of ten cents per horsepower; for each and every theoretical horsepower in excess of one thousand horsepower, up to and including ten thousand horsepower, at the rate of two cents per horsepower; for each and every theoretical horsepower in excess of ten thousand horsepower, at the rate of one cent per horsepower.

For undeveloped projects, the fee shall be at one-half the rates specified for projects in operation; for projects partly developed and in operation the fees paid on that portion of any project that shall have been developed and in operation shall be the full annual license fee above specified for projects in operation, and for the remainder of the power claimed under such project the fees shall be the same as for undeveloped projects. PROVIDED, That upon the filing of statement, as hereinafter required, by the United States or the state claiming the right to the use of water to any extent for the generation of power, or any other claimant to the use of water for the generation of fifty horsepower, or less, shall be exempted from the payment of all fees hereinafter required; and PROVIDED FURTHER, That any irrigation district or other municipal subdivision of the state, developing power chiefly for use in pumping of water for irrigation, may upon the filing of a statement, showing the amount of power used for irrigation pumping, be exempted to the extent of the power so used from the payment of the annual license fee herein provided for.

[1929 c 105 § 1; RRS § 11575-1.]

**RCW 90.16.060**
**Schedule of fees for claimants of water power -- Statement of claim -- Penalties -- Excessive claim -- Abandonment.**

The license fee herein required shall be paid in advance to the state department of ecology and shall be accompanied by written statement, showing the extent of the claim. Said statement shall set forth the name and address of the claimant, the name of the stream from which the water is appropriated or claimed for power development, a description of the forty acres or smallest legal subdivision in which the point of diversion and point of return are located, the date of the right as claimed, the maximum amount of water claimed, expressed in cubic feet per second of time, the total average fall utilized under such claim, the manner of developing power and the use to which the power is applied. If the regular flow is supplemented by water stored in a reservoir, the location of such reservoir, its capacity in acre

feet, and the stream from which it is filled and fed, should be given, also the date of the right as claimed for storage purposes.

Should any claimant fail or neglect to file such statement within the time specified, or fail or neglect to pay such fees within the time specified, the fees due and payable shall be at the schedule rates set out in RCW 90.16.050, increased twenty-five percent, and the state shall have preference lien therefor, with interest at the rate of ten percent per annum from the date of delinquency, upon the property of claimant used or necessary for use in the development of the right or claim, together with any improvements erected thereon for such development, and upon request from the director of ecology the attorney general shall proceed to foreclose the lien, and collect the amount due, as herein provided, in the same manner as other liens for general state and county taxes on real property are foreclosed.

The filing of a claim to water in excess of the amount to which the claimant is legally entitled shall not operate to vest in such claimant any right to the use of such excess water, nor shall the payment of the annual license fees, provided for herein, operate to vest in any claimant any right to the use of such water beyond the amount to which claimant is legally entitled. The filing of such claim, or claims to water shall be conclusive evidence of abandonment by the claimant of all right to water for power purposes not covered by the claim, or claims, as filed; and the failure to file statement and pay the fees, as herein required, for any power site or claim of power rights on account of riparian ownership within two years after June 12, 1929, shall be conclusive evidence of abandonment. The amount of the theoretical horsepower upon which fees shall be paid shall be computed by multiplying the maximum amount of water claimed, expressed in cubic feet per second of time, by the average fall utilized, expressed in feet, and dividing the product by 8.8.

[1988 c 127 § 78; 1929 c 105 § 2; RRS § 11575-2. Formerly RCW 90.16.060, 90.16.070 and 90.16.080.]

**RCW 90.54.170**
**Electric generation facility -- Evaluation of application to appropriate water.**

In addition to other requirements of this chapter, when the proposed water resource development project involves a new water supply combined with an electric generation facility where such electricity generated may be sold to an entity authorized by law to distribute electricity, the department shall evaluate and utilize, in connection with any application to appropriate water pursuant to the water code, chapter 90.03 RCW, sufficient information furnished by the project applicant regarding the need for the project, alternative means of serving the purposes of the project, the cumulative effects of the project and similar projects that are built, under construction or permitted in the relevant river basin or basins, the impact, if any, on flood control plans and an estimate of the impact, if any, of the sale of the project's electricity on the rates of utility customers of the Bonneville power administration. Such information shall be furnished at the project applicant's own cost and expense.

[1985 c 444 § 6.]

***FUNDING***

RCW 43.83B.020
General obligation bonds -- Authorized -- Issuance, sale, terms -- Appropriation required.
For the purpose of providing funds for the planning, acquisition, construction, and improvement of water supply facilities within the state, the state finance committee is authorized to issue general obligation bonds of the state of Washington in the sum of seventy-five million dollars or so much thereof as may be required to finance the improvements defined in this chapter and all costs incidental thereto. These bonds shall be paid and discharged within twenty years of the date of issuance or within thirty years should Article VIII of the Constitution of the state of Washington be amended to permit such longer term. No bonds authorized by this chapter shall be offered for sale without prior legislative appropriation of the proceeds of such bonds to be sold.
[1977 ex.s. c 242 § 2; 1972 ex.s. c 128 § 2.]

**RCW 43.83B.050**
**Definitions.**
As used in this chapter, the term "water supply facilities" shall mean municipal, industrial, and agricultural water supply and distribution systems including, but not limited to, all equipment, utilities, structures, real property, and interests in and improvements on real property, necessary for or incidental to the acquisition, construction, installation, or use of any municipal, industrial, or agricultural water supply or distribution system.

As used in this chapter, the term "public body" means the state of Washington, or any agency, political subdivision, taxing district, or municipal corporation thereof, a board of joint control, an agency of the federal government, and those Indian tribes now or hereafter recognized as such by the federal government for participation in the federal land and water conservation program and which may constitutionally receive grants or loans from the state of Washington.
[1996 c 320 § 20; 1975 c 18 § 1; 1972 ex.s. c 128 § 5.]

**RCW 43.83B.210**
**Loans or grants from department of ecology -- Authorized -- Limitations.**
The department of ecology is authorized to make loans or grants or combinations thereof from funds under RCW 43.83B.010 through 43.83B.110 to eligible public bodies as defined in RCW 43.83B.050 for rehabilitation or betterment of agricultural water supply facilities, and/or construction of agricultural water supply facilities required to develop new irrigated lands. The department of ecology may make such loans or grants or combinations thereof as matching funds in any case where federal, local, or other funds have been made available on a matching basis. A loan or combination loan and grant shall not exceed fifty percent of the approved eligible project cost for any single proposed project. Any grant or grant portion of a combination loan and grant from funds under RCW 43.83B.010 through 43.83B.110 for any single proposed project shall not exceed fifteen percent of the eligible project costs: PROVIDED, That the fifteen percent limitation established herein shall not be applicable to project commitments which the director or deputy director of the state department of ecology made to the bureau of reclamation of the United States department of interior for providing state funding at thirty-five percent of project costs during the period between August 1, 1974, and June 30, 1975.
[1989 c 171 § 7; 1988 c 46 § 1; 1987 c 343 § 4; 1977 ex.s. c 1 § 11; 1975-'76 2nd ex.s. c 36 § 1; 1975 1st ex.s. c 295 § 3.]

***RCW 43.99E.015***

General obligation bonds -- Authorized -- Issuance, sale, terms -- Appropriation required.

For the purpose of providing funds for the planning, acquisition, construction, and improvement of water supply facilities within the state, the state finance committee is authorized to issue general obligation bonds of the state of Washington in the sum of sixty-five million dollars, or so much thereof as may be required, to finance the improvements defined in this chapter and all costs incidental thereto. These bonds shall be paid and discharged within thirty years of the date of issuance in accordance with Article VIII, section 1 of the state Constitution. No bonds authorized by this chapter may be offered for sale without prior legislative appropriation of the proceeds of the bonds to be sold.

[1990 1st ex.s. c 15 § 8. Prior: 1989 1st ex.s. c 14 § 11; 1989 c 136 § 4; 1979 ex.s. c 234 § 2.]

**RCW 43.99E.030**

**Definitions.**

As used in this chapter, the term "water supply facilities" means domestic, municipal, industrial, and agricultural (and any associated fishery, recreational, or other beneficial use) water supply or distribution systems including but not limited to all equipment, utilities, structures, real property, and interests in and improvements on real property necessary for or incidental to the acquisition, construction, installation, or use of any such water supply or distribution system.

As used in this chapter, the term "public body" means the state of Washington or any agency, political subdivision, taxing district, or municipal or public corporation thereof; a board of joint control; an agency of the federal government; and those Indian tribes which may constitutionally receive grants or loans from the state of Washington.

[1996 c 320 § 21; 1979 ex.s. c 234 § 5.]

**RCW 43.83B.300**

**Legislative findings -- General obligation bonds authorized -- Issuance, terms -- Appropriation required.**

The legislature finds that the fundamentals of water resource policy in this state must be reviewed by the legislature to ensure that the water resources of the state are protected and fully utilized for the greatest benefit to the people of the state of Washington. The legislature further finds that it is necessary to provide the department of ecology with emergency powers to authorize withdrawals of public surface and ground waters, including dead storage within reservoirs, on a temporary basis, and construction of facilities in relation thereto, in order to alleviate emergency water supply conditions arising from the drought forecast for the state of Washington during 1977 and during 1987 through 1989.

The legislature further finds that there is a continuing water supply shortage in many areas of the state and that there is an urgent need to assure the survival of irrigated crops and of the state's fisheries.

The legislature further finds that in addition to water storage facilities or other augmentation programs, improved efficiency of water use could provide an important new supply of water in many parts of the state with which to meet future water needs and that improved efficiency of water use should receive greater emphasis in the management of the state's water resources.

In order to study the fundamentals of water resource policy of the state and to provide needed moneys for the planning, acquisition, construction, and improvement of water supply facilities and for other appropriate measures to assure the survival of irrigated crops and/or the state's fisheries to alleviate emergency water supply conditions arising from droughts occurring from time to time in the state of Washington, and to carry

out a comprehensive water use efficiency study for the state of Washington, the state finance committee is authorized to issue general obligation bonds of the state of Washington in the sum of eighteen million dollars, or so much thereof as may be required to finance such projects, and all costs incidental thereto. No bonds authorized by this section and RCW 43.83B.360 through 43.83B.375 shall be offered for sale without prior legislative appropriation, and these bonds shall be paid and discharged within thirty years of the date of issuance in accordance with Article VIII, section 1 of the state Constitution.
[1988 c 47 § 1; 1988 c 46 § 2; 1988 c 45 § 1; 1987 c 343 § 1; 1979 ex.s. c 263 § 1; 1977 ex.s. c 1 § 1.]

**RCW 43.83B.380**
**Appropriations to department of health -- Authorized projects -- Conditions.** There is hereby appropriated to the department of health the sum of nine million seven hundred thirty-seven thousand dollars, or so much thereof as may be necessary, for the biennium ending June 30, 1977, from the general fund -- state and local improvements revolving account -- water supply facilities for the purposes authorized in *RCW **43.83B.300** through 43.83B.345 and 43.83B.210 as now or hereafter amended relating to the emergency water conditions arising from the drought forecast for the summer and fall of 1977 affecting municipal and industrial water supply distribution facilities. Prior to the expenditure of funds for projects approved by the department, the department shall file a listing of the approved projects with the senate ways and means committee and the house appropriations committee.

(2) There is hereby appropriated to the department of health the sum of five million three hundred twenty-seven thousand dollars, or so much thereof as may be necessary, for the biennium ending June 30, 1977, from the general fund -- state and local improvements revolving account -- water supply facilities to be expended for municipal and industrial water supply and distribution facility projects for which applications are in progress on March 25, 1977 and have arisen from the drought forecast for the summer and fall of 1977. Prior to the expenditure of funds for projects approved by the department, the department shall file a listing of the approved projects with the senate ways and means committee and the house appropriations committee.

The municipal and industrial water supply and distribution facilities receiving funds from the appropriations contained in this section shall comply with the eligible costs criteria, health and design standards, and contract performance requirements of the municipal and industrial funding program under chapter 43.83B RCW. All projects shall be evaluated by applying the said chapter's evaluation and prioritization criteria to insure that only projects related to water shortage problems receive funding. The projects funded shall be limited to those projects providing interties with adjacent utilities, an expanded source of supply, conservation projects which will conserve or maximize efficiency of the existing supply, or a new source of supply. No obligation to provide a grant for a project authorized under this section shall be incurred after June 30, 1977.
[1991 c 3 § 300; 1977 ex.s. c 1 § 17.]

## *Session Laws of 1995, 2nd Special Session*

**Chapter 16, Section 302. FOR THE DEPARTMENT OF ECOLOGY**

**Referendum 38 water supply facilities (74-2-006)**

$2,500,000 of the state and local improvements revolving account is provided solely for funding the state's cost share in the water conservation demonstration project--Yakima river reregulation reservoir.

| | |
|---|---|
| **Reappropriation:** | |
| **LIRA, Water Sup Fac--State** | **$ 9,374,371** |
| **Appropriation:** | |
| **LIRA, Water Sup Fac--State** | **$ 1,000,000** |
| Prior Biennia (Expenditures) | $ 5,738,929 |
| Future Biennia (Projected Costs) | $ 20,712,800 |
| TOTAL | $ 36,826,100 |

[NOTE: In addition to the above, Session Laws of 1983, First Executive Session, Chapter 18, appropriated $14.5 million for Ref. 38 storage projects.]

**Session Laws 1998 Legislative Session**

## *Chapter 346, Section 303*

(3) $300,000 of the general fund--state appropriation for fiscal year 1998 is provided solely for the department to conduct a preconstruction analysis of Pine Hollow, located near the communities of Wiley City and Tampico in Yakima county, regarding its suitability as a site for the construction of a retainment dam and water storage reservoir and the reservoir site's potential to enhance and maintain anadromous fish and other aquatic life and agriculture. The analysis shall include, but is not limited to, a hydrologic and water rights assessment of the Ahtanum Creek watershed to determine water availability to Pine Hollow, an analysis of the geology and hydrology of the site and appropriate dam design and dynamics, its impact on water-related issues, and on Yakama Indian Nation and other waterrights. Using amounts appropriated in this section and the associated local match, the department shall conduct portions of its analysis through contracts with private entities and through contracts with, or by providing grant moneys to, the Yakama Indian Nation and other public entities, which may include other state agencies, irrigation districts local to the area, cities, Yakima county, and federal agencies. The department shall consult with stakeholders before conducting this preconstruction analysis. The analysis shall be completed by June 30,1999. The amount provided in this subsection is contingent upon the provision of an equal cash match from the Ahtanum irrigation district, and if such a match is not received the amount provided in this subsection shall lapse.

**Session Laws 2000 2nd Special Legislative Session**

## *Chapter 1, Section 301*

(24) $300,000 of the state drought preparedness account--state appropriation for fiscal year 2001 is provided solely for a preconstruction and feasibility analysis of the Roza irrigation district off-stream storage project at Washout canyon. Moneys may be expended from the amount provided in this subsection only to the extent that matching funds in cash and in-kind contributions are provided by the Roza irrigation district. If this match is not provided by the district, the amount provided in this subsection shall lapse.

**RCW 43.21A.450**
**Control of outflow and level of Lake Osoyoos -- Lake Osoyoos International Water Control Structure authorized.**

(1) The legislature recognizes the need for the state of Washington to implement an understanding reached with the Province of British Columbia in relation to a joint venture with British Columbia for controlling the outflow and level of Lake Osoyoos, an international lake, and in connection therewith to replace an existing lake control structure on the Okanogan river in Washington state which has been classified as deteriorated and unsafe.

(2) For the purpose of implementing subsection (1) of this section, the department of ecology may acquire, design, construct, own, operate, and maintain a project to be known as the Lake Osoyoos International Water Control Structure and may acquire all real property interests necessary thereto by purchase, grant, gift, or eminent domain; provided that the authority of eminent domain as granted to the department under this section is limited to acquiring property necessary for access to the control structure, location of abutments for the control structure, and flowage easements if necessary.

(3) The department may accept and administer grants or gifts from any source for the purpose of carrying out subsection (2) of this section.

(4) The department may exercise its powers under subsection (2) of this section directly or through contracts, except that it may not delegate its authority of eminent domain. The department may also enter into agreements with any public or municipal corporation with respect to operation and maintenance of the project authorized under subsection (2) of this section.
[1985 c 27 § 1; 1982 c 76 § 1.]

RCW 75.20.110
Columbia river anadromous fish sanctuary -- Restrictions.

(1) Except for the north fork of the Lewis river and the White Salmon river, all streams and rivers tributary to the Columbia river downstream from McNary dam are established as an anadromous fish sanctuary. This sanctuary is created to preserve and develop the food fish and game fish resources in these streams and rivers and to protect them against undue industrial encroachment.

(2) Within the sanctuary area:

(a) The department shall not issue hydraulic project approval to construct a dam greater than twenty-five feet high within the migration range of anadromous fish as determined by the department.

(b) A person shall not divert water from rivers and streams in quantities that will reduce the respective stream flow below the annual average low flow, based upon data published in United States geological survey reports.

(3) The commission may acquire and abate a dam or other obstruction, or acquire any water right vested on a sanctuary stream or river, which is in conflict with the provisions of subsection (2) of this section.

(4) Subsection (2)(a) of this section does not apply to the sediment retention structure to be built on the North Fork Toutle river by the United States army corps of engineers.
[1998 c 190 § 89; 1995 1st sp.s. c 2 § 27 (Referendum Bill No. 45, approved November 7, 1995); 1993 sp.s. c 2 § 36; 1988 c 36 § 36; 1985 c 307 § 5; 1983 1st ex.s. c 46 § 76; 1961 c 4 § 1; Initiative Measure No. 25, approved November 8, 1960.]

## NOT INCLUDED IN FINAL TASK FORCE HANDOUT

**RCW 43.20.230**
**Water resource planning -- Procedures, criteria, technical assistance.**
Consistent with the water resource planning process of the department of ecology, the department of health shall:

(1) Develop procedures and guidelines relating to water use efficiency, as defined in *section 4(3), chapter 348, Laws of 1989, to be included in the development and approval of cost-efficient water system plans required under RCW 43.20.050;

(2) Develop criteria, with input from technical experts, with the objective of encouraging the cost-effective reuse of greywater and other water recycling practices, consistent with protection of public health and water quality;

(3) Provide advice and technical assistance upon request in the development of water use efficiency plans; and

(4) Provide advice and technical assistance on request for development of model conservation rate structures for public water systems. Subsections (1), (2), and (3) of this section are subject to the availability of funding.
[1993 sp.s. c 4 § 9; 1989 c 348 § 12.]

**RCW 43.20.235**
**Water conservation -- Water delivery rate structures.**
Water purveyors required to develop a water system plan pursuant to RCW 43.20.230 shall evaluate the feasibility of adopting and implementing water delivery rate structures that encourage water conservation. This information shall be included in water system plans submitted to the department of health for approval after July 1, 1993. The department shall evaluate the following:

(1) Rate structures currently used by public water systems in Washington; and

(2) Economic and institutional constraints to implementing conservation rate structures.
[1998 c 245 § 58; 1993 sp.s. c 4 § 10.]

**RCW 70.116.010**
**Legislative declaration.**
The legislature hereby finds that an adequate supply of potable water for domestic, commercial, and industrial use is vital to the health and well-being of the people of the state. Readily available water for use in public water systems is limited and should be developed and used efficiently with a minimum of loss or waste.
In order to maximize efficient and effective development of the state's public water supply systems, the department of health shall assist water purveyors by providing a procedure to coordinate the planning of the public water supply systems.
[1991 c 3 § 365; 1977 ex.s. c 142 § 1.]

**RCW 70.116.040**
**Critical water supply service area -- Designation -- Establishment or amendment of external boundaries -- Procedures.**

(1) The secretary and the appropriate local planning agencies and purveyors, shall study geographical areas where water supply problems related to uncoordinated planning, inadequate water quality or unreliable service appear to exist. If the results of the study indicate that such water supply problems do exist, the secretary or the county legislative authority shall designate the area involved as being a critical water supply service area, consult with the appropriate local planning agencies and purveyors, and appoint a committee of not less than three representatives therefrom solely

for the purpose of establishing the proposed external boundaries of the critical water supply service area. The committee shall include a representative from each purveyor serving more than fifty customers, the county legislative authority, county planning agency, and health agencies. Such proposed boundaries shall be established within six months of the appointment of the committee.

During the six month period following the establishment of the proposed external boundaries of the critical water supply services areas, the county legislative authority shall conduct public hearings on the proposed boundaries and shall modify or ratify the proposed boundaries in accordance with the findings of the public hearings. The boundaries shall reflect the existing land usage, and permitted densities in county plans, ordinances, and/or growth policies. If the proposed boundaries are not modified during the six month period, the proposed boundaries shall be automatically ratified and be the critical water supply service area.

After establishment of the external boundaries of the critical water supply service area, no new public water systems may be approved within the boundary area unless an existing water purveyor is unable to provide water service.

(2) At the time a critical water supply service area is established, the external boundaries for such area shall not include any fractional part of a purveyor's existing contiguous service area.

(3) The external boundaries of the critical water supply service area may be amended in accordance with procedures prescribed in subsection (1) of this section for the establishment of the critical water supply service areas when such amendment is necessary to accomplish the purposes of this chapter.
[1977 ex.s. c 142 § 4.]

**RCW 90.42.050**
**Guidelines governing trust water rights -- Submission of guidelines to joint select committee.**
The department, in cooperation with federally recognized Indian tribes, local governments, state agencies, and other interested parties, shall establish guidelines by July 1, 1992, governing the acquisition, administration, and management of trust water rights. The guidelines shall address at a minimum the following:
(1) Methods for determining the net water savings resulting from water conservation projects or programs carried out in accordance with this chapter, and other factors to be considered in determining the quantity or value of water available for potential designation as a trust water right;
(2) Criteria for determining the portion of net water savings to be conveyed to the state under this chapter;
(3) Criteria for prioritizing water conservation projects;
(4) A description of potential public benefits that will affect consideration for state financial assistance in RCW 90.42.030;
(5) Procedures for providing notification to potentially interested parties;
(6) Criteria for the assignment of uses of trust water rights acquired in areas of the state not addressed in a regional water resource plan or critical area agreement; and
(7) Contracting procedures and other procedures not specifically addressed in this section.
These guidelines shall be submitted to the joint select committee on water resource policy before adoption.
[1991 c 347 § 9.]
**NOTES:**
**Purposes -- 1991 c 347:** See note following RCW 90.42.005.

# Appendix D
# U.S. Forest Service Aquatic Conservation Strategy

# U.S. Forest Service
# Aquatic Conservation Strategy

(as received by Department of Ecology in October 2000).

## Aquatic Conservation Strategy

The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of Pacific Ocean anadromy.

This conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime. Land use activities need to be limited or excluded in those parts of the watershed prone to instability. The distribution of land use activities, such as timber harvest or roads, must minimize increases in peak streamflows. Headwater riparian areas need to be protected, so that when debris slides and flows occur they contain coarse woody debris and boulders necessary for creating habitat farther downstream. Riparian areas along larger channels need protection to limit bank erosion, ensure an adequate and continuous supply of coarse woody debris to channels, and provide shade and microclimate protection. Watersheds currently containing the best habitat or those with the greatest potential for recovery should receive increased protection and receive highest priority for restoration programs.

Any species-specific strategy aimed at defining explicit standards for habitat elements would be insufficient for protecting even the targeted species. The Aquatic Conservation Strategy must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats. This approach seeks to prevent further degradation and restore habitat over broad landscapes as opposed to individual projects or small watersheds. Because it is based on natural disturbance processes, it may take decades, possibly more than a century, to accomplish all of its objectives. Some improvements in aquatic ecosystems, however, can be expected in 10 to 20 years.

The important phrases in these standards and guidelines are "meet Aquatic Conservation Strategy objectives," "does not retard or prevent attainment of Aquatic Conservation Strategy objectives," and "attain Aquatic Conservation Strategy objectives." These phrases, coupled with the phrase "maintain and restore" within each of the Aquatic Conservation strategy objectives, define the context for agency review and implementation of management activities. Complying

with the Aquatic Conservation Strategy objectives means that an agency must manage the riparian-dependent resources to maintain the existing condition or implement actions to restore conditions. The baseline from which to assess maintaining or restoring the condition is developed through a watershed analysis. Improvement relates to restoring biological and physical processes within their ranges of natural variability.

The standards and guidelines are designed to focus the review of proposed and certain existing projects to determine compatibility with the Aquatic Conservation Strategy objectives. The standards and guidelines focus on "meeting" and "not preventing attainment" of Aquatic Conservation Strategy objectives. The intent is to ensure that a decision maker must find that the proposed management activity is consistent with the Aquatic Conservation Strategy objectives. The decision maker will use the results of watershed analysis to support the finding. In order to make the finding that a project or management action "meets" or "does not prevent attainment" of the Aquatic Conservation Strategy objectives, the analysis must include a description of the existing condition, a description of the range of natural variability of the important physical and biological components of a given watershed, and how the proposed project or management action maintains the existing condition or moves it within the range of natural variability. Management actions that do not maintain the existing condition or lead to improved conditions in the long term would not "meet" the intent of the Aquatic Conservation Strategy and thus, should not be implemented.

## Aquatic Conservation Strategy Objectives

Forest Service and BLM-administered lands within the range of the northern spotted owl will be managed to:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

## Components of the Aquatic Conservation Strategy

1. **Riparian Reserves:** Lands along streams and unstable and potentially unstable areas where special standards and guidelines direct land use.

2. **Key Watersheds:** A system of large refugia comprising watersheds that are crucial to at-risk fish species and stocks and provide high quality water.

3. **Watershed Analysis:** Procedures for conducting analysis that evaluates geomorphic and ecologic processes operating in specific watersheds. This analysis should enable watershed planning that achieves Aquatic Conservation Strategy objectives. Watershed Analysis provides the basis for monitoring and restoration programs and the foundation from which Riparian Reserves can be delineated.

4. **Watershed Restoration:** A comprehensive, long-term program of watershed restoration to restore watershed health and aquatic ecosystems, including the habitats supporting fish and other aquatic and riparian-dependent organisms.

These components are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems. Late-Successional Reserves are also an important component of the Aquatic Conservation Strategy. The standards and guidelines under which Late-Successional Reserves are managed provide increased protection for all stream types. Because these reserves possess late-successional characteristics, they offer core areas of high quality stream habitat that will act as refugia and centers from which degraded areas can be recolonized as they recover. Streams in these reserves may be particularly important for endemic or locally distributed fish species and stocks.

### 1. Riparian Reserves

There are an estimated 2,627,500 acres of Riparian Reserves interspersed within the matrix. (Acres for matrix listed elsewhere in these standards and guidelines do not include Riparian Reserves.) Riparian Reserves and their appurtenant standards and guidelines also apply where these reserves overlap with any other land allocations. Acres of Riparian Reserves within other land allocations is not calculated, but is estimated to encompass 40 percent (based on a sample) of those allocations. The percent of area in Riparian Reserves varies markedly among administrative units, from a high of approximately 74 percent on the Siuslaw National Forest, to a low of approximately 4 percent on the Deschutes National Forest.

Riparian Reserves are portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. Standards and guidelines prohibit and regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives. Riparian Reserves include those portions of a watershed directly coupled to streams and rivers, that is, the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing waterbodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. Riparian Reserves include areas designated in current plans and draft plan preferred alternatives as riparian management areas or streamside management zones and primary source

areas for wood and sediment such as unstable and potentially unstable areas in headwater areas and along streams. Riparian Reserves occur at the margins of standing and flowing water, intermittent stream channels and ephemeral ponds, and wetlands. Riparian Reserves generally parallel the stream network but also include other areas necessary for maintaining hydrologic, geomorphic, and ecologic processes.

Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. The Riparian Reserves will also serve as connectivity corridors among the Late-Successional Reserves.

Interim widths for Riparian Reserves necessary to meet Aquatic Conservation Strategy objectives for different waterbodies are established based on ecologic and geomorphic factors. These widths are designed to provide a high level of fish habitat and riparian protection until watershed and site analysis can be completed. Watershed analysis will identify critical hillslope, riparian, and channel processes that must be evaluated in order to delineate Riparian Reserves that assure protection of riparian and aquatic functions. Riparian Reserves are delineated during implementation of site-specific projects based on analysis of the critical hillslope, riparian, and channel processes and features. Although Riparian Reserve boundaries may be adjusted on permanently-flowing streams, the prescribed widths are considered to approximate those necessary for attaining Aquatic Conservation Strategy objectives. Post-watershed analysis Riparian Reserve boundaries for permanently-flowing streams should approximate the boundaries prescribed in these standards and guidelines. However, post-watershed analysis Riparian Reserve boundaries for intermittent streams may be different from the existing boundaries. The reason for the difference is the high variability of hydrologic, geomorphic and ecologic processes in a watershed affecting intermittent streams. At the same time, any analysis of Riparian Reserve widths must also consider the contribution of these reserves to other, including terrestrial, species. Watershed analysis should take into account all species that were intended to be benefited by the prescribed Riparian Reserve widths. Those species include fish, mollusks, amphibians, lichens, fungi, bryophytes, vascular plants, American marten, red tree voles, bats, marbled murrelets, and northern spotted owls. The specific issue for spotted owls is retention of adequate habitat conditions for dispersal.

The prescribed widths of Riparian Reserves apply to all watersheds until watershed analysis is completed, a site-specific analysis is conducted and described, and the rationale for final Riparian Reserve boundaries is presented through the appropriate NEPA decision-making process.

## Riparian Reserve Widths

Riparian Reserves are specified on page C-30 of these standards and guidelines for the following five categories of streams or waterbodies:

- Fish-bearing streams
- Permanently flowing nonfish-bearing streams
- Constructed ponds and reservoirs, and wetlands greater than 1 acre
- Lakes and natural ponds
- Seasonally flowing or intermittent streams, wetlands less than 1 acre, and unstable and potentially unstable areas

Standards and guidelines specific to Riparian Reserves begin on page C-31.

## Intermittent Streams

Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria.

Including intermittent streams and wetlands within Riparian Reserves is important for successful implementation of the Aquatic Conservation Strategy. Accurate identification of these features is critical to the correct implementation of the strategy and protection of the intermittent stream and wetland functions and processes. Identification of these features is difficult at times due to the lack of surface water or wet soils during dry periods. The following discussion provides guidance on steps to identify these features for inclusion within Riparian Reserves.

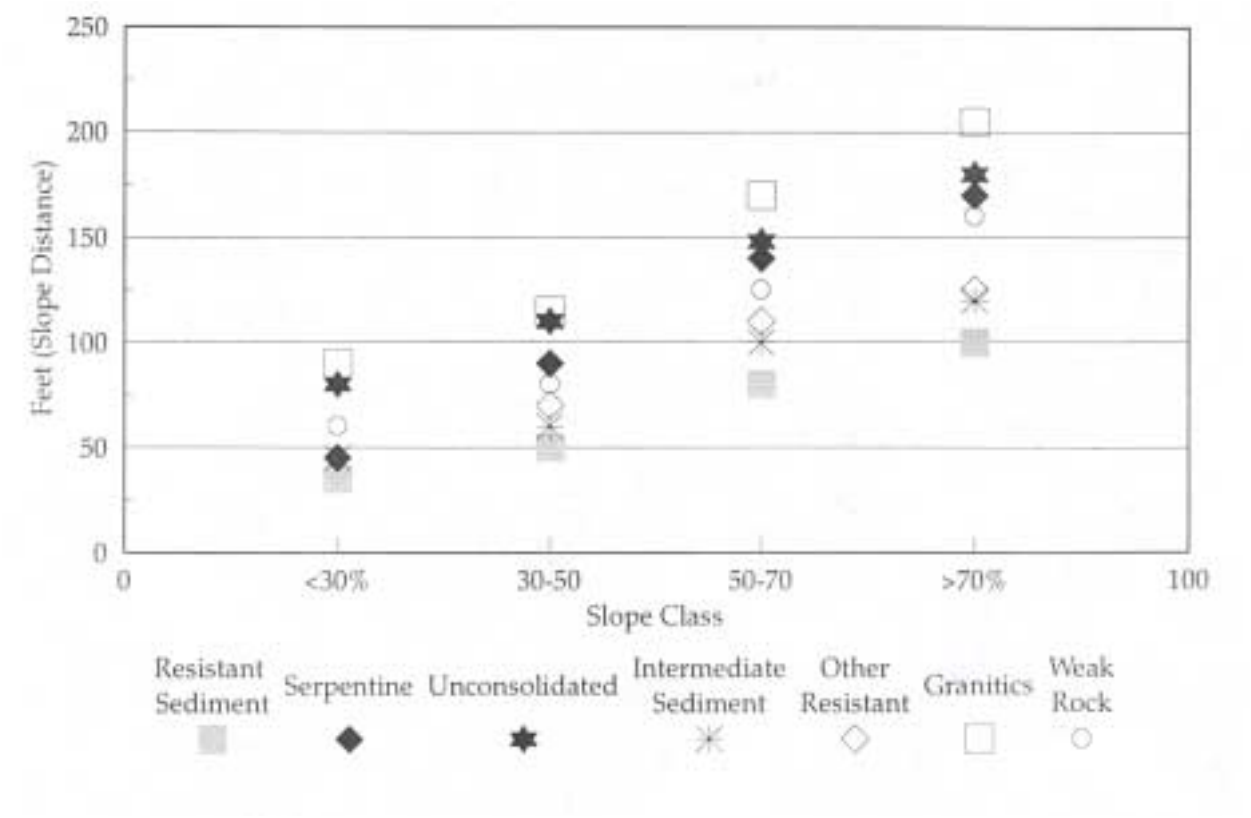
Fish-bearing streams are distinguished from intermittent streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the standards and guidelines for fish-bearing streams would apply to those sections of the intermittent stream used by the fish.

The following discussion pertains to Riparian Reserve widths on intermittent streams and wetlands necessary to meet Aquatic Conservation Strategy objectives. Other Riparian Reserve objectives, such as providing wildlife dispersal corridors, could lead to Riparian Reserve widths different than those necessary to protect the ecological integrity of the intermittent stream or wetland. These other objectives could yield wider Riparian Reserves than those necessary to meet Aquatic Conservation Strategy objectives. There can never be instances where Riparian Reserves would be narrower than the widths necessary to meet Aquatic Conservation Strategy objectives.

The width of Riparian Reserves necessary to protect the ecological integrity of intermittent streams varies with slope and rock type. Figure B-1 shows the estimated size of Riparian Reserves necessary to protect the ecological values of intermittent streams with different slope and rock types. These estimates were made by geomorphologists, hydrologists, and fish biologists from the Bureau of Land Management, Forest Service, and the Environmental Protection Agency. These distances are consistent with the height of one site-potential tree used to define Riparian Reserve widths (see page C-30 of these standards and guidelines).

Watershed analysis provides the ecological and geomorphic basis for changing the size and location of Riparian Reserves.

**Figure B-1.** Ecological protection needs for intermittent streams, by slope class and rock type. Figure shows width, measured as slope distance, needed for streamside protection for reasons other than slope stability. These widths were estimated by an interagency team of scientists based on professional judgment and experience. Protection needs included surface erosion of streamside slopes, fluvial erosion of the stream channel, soil productivity, habitat for riparian-dependent species, the ability of streams to transmit damage downstream, and the role of streams in the distribution of large wood to downstream fish-bearing waters.



The prescribed widths for Riparian Reserves apply to all streams, lakes, ponds and wetlands on lands administered by the Forest Service and BLM within the range of the northern spotted owl until a watershed analysis is completed. Watershed analysis is expected to yield the contextual information needed to define ecologically and geomorphically appropriate Riparian Reserves. Analysis of site-specific characteristics may warrant Riparian Reserves that are narrower or wider than the prescribed widths. Thus, it is possible to meet the objectives of at least the Aquatic Conservation Strategy portion of these standards and guidelines with post-watershed analysis reserve boundaries for intermittent streams that are quite different from those conforming to the prescribed widths. Regardless of stream type, changes to Riparian Reserves must be based on scientifically sound reasoning, and be fully justified and documented.

**Wetlands**

The combinations of hydrology, soils, and vegetative characteristics are the primary factors influencing the development of wetland habitats. There must be the presence of surface water or saturated soils to significantly reduce the oxygen content in the soils to zero or near zero concentrations. These low or zero soil oxygen conditions must persist for sufficient duration to promote development of plant communities that have a dominance of species adapted to survive and grow under zero oxygen conditions. These wetland characteristics apply when defining wetlands for regulatory jurisdiction or for technical analysis when conducting inventories or functional assessments. Seeps and springs can be classified as streams if they have sufficient flow in a channel or as seasonal or perennial wetlands under the criteria defined in the 1987 Corps of Engineers Wetlands Manual. The standards and guidelines for wetlands, which are based on the hydrologic, physical and biologic characteristics described in the manual, apply to seeps and springs regardless of their size.

Formal definition for implementing section 404 of the Clean Water Act, adopted by the Environmental Protection Agency, is as follows:

> The term wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

Detailed technical methods have been developed to assist in identification of wetlands that meet the above definition. Currently, the field manual being used for implementing the Clean Water Act is the "1987 Corps Manual."

For purposes of conducting the National Wetland Inventory, the Fish and Wildlife Service has broadly defined both vegetated and nonvegetated wetlands as follows:

> Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three

attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Wetlands typically occur within and adjacent to riparian zones. It is frequently difficult to differentiate wetlands from riparian areas based on the definitions. Most typically, and particularly in forested landscapes, the riparian zone is defined by its spatial relation to adjacent streams or rivers. However, riparian zones are also commonly considered to be lands integrally related to other aquatic habitats such as lakes, reservoirs, intermittent streams, springs, seeps, and wetlands.

Because of such conceptual and definitional vagaries, there is spatial overlap between wetlands and riparian zones. This then results in only a portion of the riparian zone associated with rivers and streams being considered as wetlands. The extent of that portion will depend on the specifics of hydrologic, vegetation, and soil features. The functions of the wetland portion may also be distinct from the nonwetlands. For example, wetlands may provide habitat for specialized plant species or reproductive habitat for amphibians or other organisms that would not be provided by riparian areas.

Once the Riparian Reserve width is established, either based on existing widths or watershed analysis, then land management activities allowed in the Riparian Reserve will be directed by standards and guidelines for managing Riparian Reserves (see page C-31). The standards and guidelines for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives.

**Summary of Aquatic Conservation Strategy for Riparian Reserves**

- Involves portions of the landscape where riparian-dependent and stream resources receive primary emphasis.
- Riparian Reserves are designated for all permanently-flowing streams, lakes, wetlands, and intermittent streams.
- Riparian Reserves include the body of water, inner gorges, all riparian vegetation, 100-year floodplain, landslides and landslide prone areas.
- Reserve widths are based on some multiple of a site-potential tree or a prescribed slope distance, whichever is greater. Reserve widths may be adjusted based on watershed analysis to meet Aquatic Conservation Strategy objectives.
- Standards and guidelines prohibit programmed timber harvest, and manage roads, grazing, mining and recreation to achieve objectives of the Aquatic Conservation Strategy (see page C-31).

## 2. Key Watersheds

There are 8,119,400 acres of Tier 1 Key Watersheds, and 1,001,700 acres of Tier 2 Key Watersheds within the range of the northern spotted owl. Key Watersheds overlay the land allocations of designated areas and matrix as follows:

Acres in each designated area and matrix, by Key and non-Key Watersheds.

| | Tier 1 | Tier 2 | non-Key | Total |
|---|---|---|---|---|
| Designated Areas | | | | |
| Congressionally Reserved Areas | 2,728,000 | 311,200 | 4,281,400 | 7,320,600 |
| Late- Successional Reserves | 3,151,700 | 279,100 | 4,000,000 | 7,430,800 |
| Adaptive Management Areas | 228,100 | 60,600 | 1,233,100 | 1,521,800 |
| Managed Late-Successional Areas | 55,100 | 0 | 47,100 | 102,200 |
| Administratively Withdrawn Areas | 407,900 | 54,700 | 1,014,500 | 1,477,100 |
| Riparian Reserves (based on sample) | 631,000 | 113,700 | 1,882,800 | 2,627,500 |
| Matrix | | | | |
| Matrix | 917,600 | 182,400 | 2,875,300 | 3,975,300 |
| Total | 8,119,400 | 1,001,700 | 15,334,200 | 24,455,300 |

Refugia are a cornerstone of most species conservation strategies. They are designated areas that either provide, or are expected to provide, high quality habitat. A system of Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. These refugia include areas of high quality habitat as well as areas of degraded habitat. Key Watersheds with high quality conditions will serve as anchors for the potential recovery of depressed stocks. Those of lower quality habitat have a high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program (see Watershed Restoration later in this section of these standards and guidelines).

The Aquatic Conservation Strategy includes two designations for Key Watersheds. Tier 1 (Aquatic Conservation Emphasis) Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. Tier 1 Key Watersheds consist primarily of watersheds identified previously by the Scientific Panel on Late-Successional Forest Ecosystems (1991), and in the Scientific Analysis Team Report (1993). The network of 143 Tier 1 Key Watersheds ensures that refugia are widely distributed across the landscape. While 21 Tier 2 (other) Key Watersheds may not contain at-risk fish stocks, they are important sources of high quality water.

Long-term management within Key Watersheds requires watershed analysis prior to further resource management activity. In the short term, until watershed analysis can be completed, minor activities such as those that would be Categorically Excluded under National Environmental Policy Act regulations (except timber harvest) may proceed if they are consistent with Aquatic Conservation Strategy objectives and apply Riparian Reserves and standards and

guidelines. Timber harvest, including salvage, can not occur in Key Watersheds without a watershed analysis. Key Watersheds that currently contain poor quality habitat are believed to have the best opportunity for successful restoration and will receive priority in any watershed restoration program.

**Roadless Areas and Key Watersheds**

Management activities in inventoried roadless areas with unstable land will increase the risk to aquatic and riparian habitat, impair the capacity of Key Watersheds to function as intended, and limit the potential to achieve Aquatic Conservation Strategy objectives. Standards and guidelines that refer to inventoried roadless areas (or simply "roadless areas") apply only to those portions of such areas that would still qualify as roadless under the guidelines used to originally designate the areas under the second Forest Service Roadless Area Review and Evaluation (RARE II).

To protect the remaining high quality habitats, no new roads will be constructed in inventoried roadless areas in Key Watersheds. Watershed analysis must be conducted in all non-Key Watersheds that contain roadless areas before any management activities can occur within those roadless areas.

The amount of existing system and nonsystem roads within Key Watersheds should be reduced through decommissioning of roads. Road closures with gates or barriers do not qualify as decommissioning or a reduction in road mileage. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds. That is, for each mile of new road constructed, at least one mile of road should be decommissioned, and priority given to roads that pose the greatest risks to riparian and aquatic ecosystems.

**Summary of Aquatic Conservation Strategy for Key Watersheds**

- Tier 1 Key Watersheds were selected for directly contributing to anadromous salmonid and bull trout conservation.
- Tier 2 Key Watersheds were selected as sources of high quality water and may not contain at-risk fish stocks
- No new roads will be built in roadless areas in Key Watersheds.
- Reduce existing system and nonsystem road mileage outside roadless areas. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds.
- Key Watersheds are highest priority for watershed restoration.
- Watershed analysis is required prior to management activities, except minor activities such as those Categorically Excluded under NEPA (and not including timber harvest).
- Timber harvest cannot occur in Key Watersheds prior to completing a watershed analysis.

Standards and guidelines specific to Key Watersheds are summarized on page C-7 of these standards and guidelines.

## 3. Watershed Analysis

Watershed analysis, as described here, focuses on implementing the Aquatic Conservation Strategy. The broader role of watershed analysis in relation to implementing the ecosystem management objectives proposed by these standards and guidelines is described in Section E, Implementation. Watershed analysis is one of the principal analyses that will be used in making decisions on implementation of the Aquatic Conservation Strategy.

Watershed analysis is required in Key Watersheds, for roadless areas in non-Key Watersheds, and Riparian Reserves prior to determining how proposed land management activities meet Aquatic Conservation Strategy objectives. Watershed analyses must be completed before initiating actions within a Key Watershed, except that in the short term, until watershed analysis can be completed, minor activities such as those that would be categorically excluded under National Environmental Policy Act regulations (except timber harvest) may proceed if they are consistent with Aquatic Conservation Strategy objectives and Riparian Reserves and standards and guidelines are applied. Timber harvest, including salvage, cannot occur in Key Watersheds without a watershed analysis. Ultimately, watershed analyses should be conducted in all watersheds on federal lands as a basis for ecosystem planning and management.

Watershed analysis has a critical role in providing for aquatic and riparian habitat protection. In planning for ecosystem management and establishing Riparian Reserves to protect and restore riparian and aquatic habitat, the overall watershed condition and the array of processes operating there need to be considered. Watershed condition includes more than just the state of the channel and riparian area. It also includes the condition of the uplands, distribution and type of seral classes of vegetation, land use history, effects of previous natural and land-use related disturbances, and distribution and abundance of species and populations throughout the watershed. These factors strongly influence the structure and functioning of aquatic and riparian habitat. Effective protection strategies for riparian and aquatic habitat on federal lands must accommodate the wide variability in landscape conditions present across the Pacific Northwest. Watershed analysis plays a key role in the Aquatic Conservation Strategy, ensuring that aquatic system protection is fitted to specific landscapes.

Watershed analysis will focus on collecting and compiling information within the watershed that is essential for making sound management decisions. It will be an analytical process, not a decision-making process with a proposed action requiring NEPA documentation. It will serve as the basis for developing project-specific proposals, and monitoring and restoration needs for a watershed. Some analysis of issues or resources may be included in broader scale analyses because of their scope. The information from the watershed analyses will contribute to decision making at all levels. Project-specific NEPA planning will use information developed from watershed analysis. For example, if watershed analysis shows that restoring certain resources within a watershed could contribute to achieving landscape or ecosystem management objectives, then subsequent decisions will need to address that information.

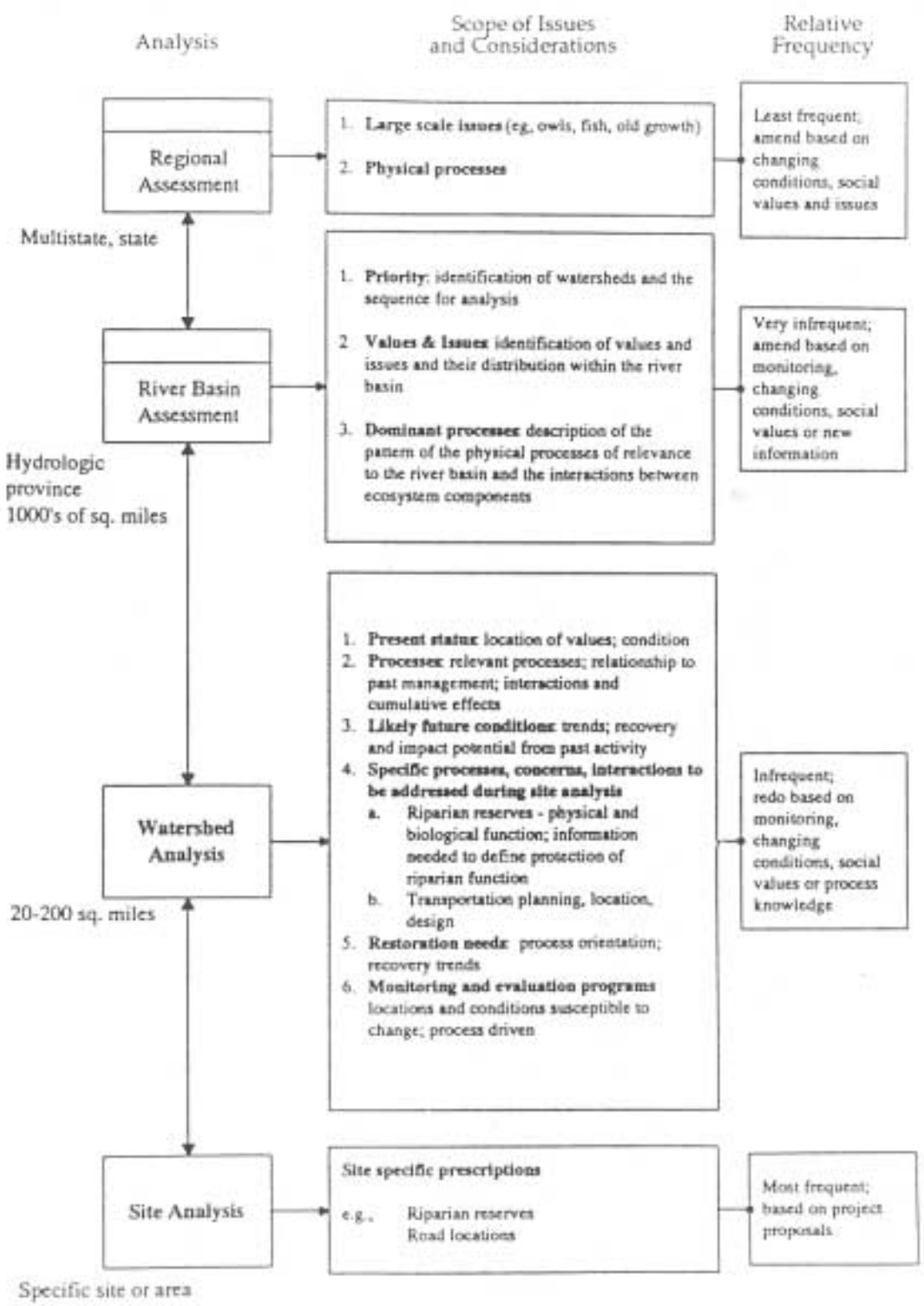
The results of watershed analyses may include a description of the resource needs, capabilities, opportunities, the range of natural variability, spatially explicit information that will facilitate environmental and cumulative effects analyses for NEPA, and the processes and functions operating within the watershed. Watershed analysis will identify potentially disjunct approaches

and conflicting objectives within watersheds. The information from watershed analysis will be used to develop priorities for funding, and implementing actions and projects, and will be used in developing monitoring strategies and objectives. The participation of adjacent landowners, private citizens, interest groups, industry, various government agencies, and others in watershed analyses will be promoted.

Watershed analysis is a systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. This information will support decisions for implementing management prescriptions, including setting and refining boundaries of Riparian Reserves and other reserves, developing restoration strategies and priorities, and revealing the most useful indicators for monitoring environmental changes. Watershed analysis is an important analytical step supporting ecosystem planning for watersheds of approximately 20 to 200 square miles (Figure B-2). It is a key component supporting watershed planning and analyzing the blending of social expectations with the biophysical capabilities of specific landscapes. Watershed analysis is the appropriate level for analyzing the effects of transportation systems on aquatic and riparian habitats within the target watershed. In contrast, issues pertaining to stocks at risk would generally be more applicable at the province or river basin analytical levels, as discussed in Section E of these standards and guidelines, rather than the 20 to 200 square mile watershed level.

Watershed analysis consists of technically rigorous and defensible procedures designed to identify processes that are active within a watershed, how those processes are distributed in time and space, the current upland and riparian conditions of the watershed, and how all of these factors influence riparian habitat and other beneficial uses. The analysis is conducted by an interdisciplinary team consisting of geomorphologists, hydrologists, soil scientists, biologists and other specialists as needed. Information used in this analysis includes: maps of topography, stream networks, soils, vegetation, and geology; sequential aerial photographs; field inventories and surveys including landslide, channel, aquatic habitat, and riparian condition inventories; census data on species presence and abundance; water quality data; disturbance and land use history; and other historical data (e.g., streamflow records, old channel surveys).

Figure B-2 Relationship between levels of analysis



Watershed analysis is organized as a set of modules that examine biotic and abiotic processes influencing aquatic habitat and species abundance (e.g., landslides, surface erosion, peak and low streamflows, stream temperatures, road network effects, coarse woody debris dynamics, channel processes, fire, limiting factor analysis for key species). Results from these modules are integrated into a description of current upland, riparian, and channel conditions; maps of location, frequency, and magnitude of key processes; and descriptions of location and abundance of key species.

Watershed analysis provides the contextual basis at the site level for decision makers to set appropriate boundaries of Riparian Reserves, plan land use activities compatible with disturbance patterns, design road transportation networks that pose minimal risk, identify what and where restoration activities will be most effective, and establish specific parameters and activities to be monitored. More detailed site-level analysis is conducted to provide the information and designs needed for specific projects (e.g., road siting or timber sale layout) so that riparian and aquatic habitats are protected.

Watershed analysis provides the ecologic and geomorphic basis for changing the size and location of Riparian Reserves necessary to meet Aquatic Conservation Strategy objectives. Ultimate design of Riparian Reserves is likely to be a hybrid of decisions based on consideration of sites of special ecological value, slope stability, wildlife dispersal corridors, endemic species considerations and natural disturbance processes.

Figure B-3 illustrates how slope stability and debris flow runout models may be used as part of watershed analysis for adjusting Riparian Reserves. The result is that the basin is stratified into areas that may require wider or narrower Riparian Reserves than those conforming to Riparian Reserve Scenario 1 for intermittent streams. For example, on intermittent streams in unstable areas with high potential to generate slides and debris flows, Riparian Reserves wider than those conforming to the definition may be necessary to ensure ecological integrity. Riparian Reserves in more stable areas may be less extensive, managed under upland standards and guidelines (e.g., levels of green-tree retention as either single trees or in patches of a specific size), or a combination of these.

Slope stability analysis for Augusta Creek is an example in which likely impact mechanisms are identified (Figure B-4). Distribution of areas subject to slope instability was interpreted from information contained within the Willamette National Forest Soil Resource Inventory. Slope data for each mapped unit was extracted from the Willamette National Forest Soil Resource Inventory based on whether hillslope gradients were less than 30 percent, between 30 and 60 percent, and greater than 60 percent. Geologic descriptions from the Willamette National Forest Soil Resource Inventory were used to determine whether underlying bedrock was hard, moderately hard, or soft. A hazard rating of low, moderate, or high slide potential was assigned to each mapped unit based on hillslope gradient and geologic description (Figure B-4). Predicted hazard ratings were tested and found to be in excellent agreement with the historical pattern of landslides observed on aerial photographs. This analytical step ensures that field and analysis time will be used efficiently to address the most important processes and issues in the watershed.

Using; the results from the slope stability analysis, watersheds were stratified into subareas in order to evaluate the watersheds as uniform response units for each of the processes or issues of concern. The process of determining debris flow susceptibility for Augusta Creek is an example of how a watershed might be stratified and how this stratification may be used as a basis for mapping Riparian Reserves (Figure B-3). To determine the susceptibility of different stream reaches to debris flows, a stream network map was overlaid on the slide potential map (Figure B-4). Areas with high slope instability were assumed to be most likely to generate debris flows. First-order channels (headward channels without tributaries) were assigned a debris flow hazard rating equal to the slide potential of the surrounding landscape (Figure B-4). Debris flow hazard to higher order channels downstream was assumed to be a function of two factors: channel gradient (Figure B-5) and tributary junction angle (Figure B-6). Debris flow hazard was reduced on the class where channel gradient was less than 3 degrees or tributary junction angle exceeded 70 degrees, to produce a map of debris flow potential (Figure B-7). The stratification will vary according to process or issue. Within a given physiographic province, similar geographic and topographic features control drainage network and hillslope stability patterns. These features may exert a strong influence on the design of Riparian Reserves. For example, in the highly dissected southern Oregon Coast Range, debris flows originating in channel heads are the primary mass movement process. Large, slow-moving earthflows are dominant in the western Oregon Cascades. Earthflows qualify as unstable and potentially unstable areas and would be analyzed for inclusion within Riparian Reserves for intermittent streams. To adequately protect the aquatic system from management induced landsliding, Riparian Reserve design may vary as a result of these differences. In the Coast Range, Riparian Reserves would tend to be in narrow bands associated with intermittent streams, relatively evenly distributed throughout the basin, while those in the Cascades may be locally extensive and centered around earthflows. Stable areas in other parts of the watershed may have reduced Riparian Reserves on intermittent streams.

Earthflows can cover extensive amounts of land within a watershed. As such, they largely influence the resulting landscape and directly affect aquatic and riparian habitat quality, structure and function. For example, streams flowing through active earthflows would tend to cut the toes of the inner gorges. Thus, the earthflow would serve as a chronic source of sediment to the channel. The effects of constructing roads or harvesting timber on the rate of sediment delivery to the channel on the earthflow would need to be considered daring the design of the Riparian Reserve. Thus, the amount of a particular earthflow incorporated into a Riparian Reserve, as identified through watershed analysis, depends on the risk of management-induced disturbances and meeting Aquatic Conservation Strategy objectives. The risk will be determined based on an analysis of the projected instability of the earthflow relative to the recovery rate of aquatic and riparian ecosystems. There will be cases where entire earthflows will be incorporated into Riparian Reserves and cases where only those portions determined to directly affect the rate of achieving Aquatic Conservation Strategy objectives will be incorporated.

The efficacy of many previous analyses at the watershed level suffered from unclear logic used in weighting or combining individual elements, reliance on simple indices to explain complex phenomena, and assumptions of direct or linear relations between land use intensity and watershed response. These previous watershed analyses typically did not consider how key processes are distributed over watersheds within a given landscape and, in many cases, did not

distinguish between physiographic provinces, which can vary widely in the importance of individual processes. Furthermore, most of the previous approaches lacked any method to validate their assumptions or results.

While watershed analysis can provide essential information for designing land use activities over the entire watershed, it can also highlight uncertainties in knowledge or understanding that need to be addressed. Watershed analysis is emerging as a new standard for assessing watershed condition and land use impacts. The process described in these standards and guidelines builds on more recent, comprehensive approaches, including the Water Resources Evaluation of Nonpoint Silvicultural Sources program; the watershed analysis procedure developed by the Washington State Timber, Fish and Wildlife program; and the cumulative effects methods being developed by the National Council on Air and Stream Improvement. Analysis modules in Watershed Analysis are patterned after the first two approaches because a modular approach allows flexibility in selecting methods appropriate to a particular watershed and facilitates modification of specific techniques as improved methods become available. Unique aspects of the watershed analysis procedure described in the FEMAT Report include explicit consideration of biological as well as physical processes, and the joint consideration of upland and riparian areas.

Watershed analysis is one of the important aspects of effectively implementing ecosystem planning and management on a watershed basis. Information gained through watershed analysis will be vital to adaptive management over broad physiographic provinces. When current plans and draft plan preferred alternatives are revised, information gathered through watershed analysis will, in part, be the basis of these revisions.

Summary of Aquatic Conservation Strategy for Watershed Analysis

- •Watershed analysis is a systematic procedure to characterize watersheds. The information is used to guide management prescription and monitoring programs, set and refine Riparian Reserve boundaries, and develop restoration.
- It is required in Key Watersheds prior to resource management.
- It is required in all roadless areas prior to resource management.
- It is recommended in all other watersheds.
- It is required to change Riparian Reserve widths in all watersheds.
- Earthflows qualify as unstable and potentially unstable areas and would be analyzed for inclusion within Riparian Reserves.
- Watershed analysis is important in developing monitoring strategies.

## 4. Watershed Restoration

Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. Restoration will be based on watershed analysis and planning. Watershed analysis is essential to identify areas of greatest benefit-to-cost relationships for restoration opportunities and greatest likelihood of success. Watershed analysis can also be used as a medium to develop cooperative projects involving various landowners. In many watersheds the most critical restoration needs occur on private lands downstream from federally managed lands. Decisions to apply a given treatment depend on the value and sensitivity of downstream uses, transportation needs, social expectations, risk assessment of probable outcomes for success at correcting problems, costs, and other factors. Watershed analysis, including the use of sediment budgets, provides a framework for considering benefit-to-cost relations in a watershed context. Thus, the magnitude of restoration needs within the planning area will be based on watershed analysis.

The most important components of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity. Other restoration opportunities exist, such as meadow and wetland restoration and mine reclamation, and these may be quite important in some areas. Regionally however, these opportunities are much less extensive than the three components listed above.

**Roads**

Road treatments range from full decommissioning (closing and stabilizing a road to eliminate potential for storm damage and the need for maintenance) to simple road upgrading, which leaves the road open. Upgrading can involve practices such as removing soil from locations where there is a high potential of triggering landslides, modifying road drainage systems to reduce the extent to which the road functions as an extension of the stream network, and reconstructing stream crossings to reduce the risk and consequences of road failure or washing out at the crossings.

The decision to apply a given treatment depends on the value and sensitivity of downstream uses, transportation needs, social expectations, assessment of probable outcomes for success at correcting problems, costs, and other factors. Watershed analysis, including the use of sediment budgets, provides a framework for considering benefit-to-cost relations in a watershed context. Thus, the magnitude of regional restoration needs will be based on watershed analysis.

**Riparian Vegetation**

Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves. Appropriate practices may include planting unstable areas such as landslides along streams and flood terraces, thinning densely-stocked young stands to encourage development of large conifers, releasing young conifers from overtopping hardwoods, and reforesting shrub and hardwood-dominated stands with conifers. These practices can be implemented along with silvicultural treatments in uplands areas, although the practices will differ in objective and, consequently, design.

### In-Stream Habitat Structures

In-stream restoration, based on the interpretation of physical and biological processes and deficiencies during watershed analysis, can be an important component of an overall program for restoring fish and riparian habitat. In-stream restoration measures are inherently short term and must be accompanied by riparian and upslope restoration to achieve long-term watershed restoration. Maintaining desired levels of channel habitat complexity, for example, may best be achieved in the short term by introducing structures. However, a riparian area with the complete array of functions and processes should provide coarse woody debris to the channel in the long term.

In-stream restoration will be accompanied by riparian and upslope restoration if watershed restoration is to be successful. In-stream restoration, including in-channel structures, will not be used to mitigate for management actions that degrade existing habitat, as a substitute for habitat protection, or to justify risky land management activities and practices. Priority must be given to protecting existing high quality habitat.

### Summary of Aquatic Conservation Strategy for Watershed Restoration

- Watershed restoration restores watershed processes to recover degraded habitat.
- Watershed restoration should focus on removing and upgrading roads.
- Silvicultural treatments may be used to restore large conifers in Riparian Reserves.
- Watershed restoration should restore channel complexity. In-stream structures should only be used in the short term and not as a mitigation for poor land management practices.

## Monitoring

The following monitoring section is specific to achieving the stated objectives of the Aquatic Conservation Strategy. Implementation, effectiveness, and validation monitoring need to be conducted consistent with the monitoring discussion in Section E of these standards and guidelines.

Watershed analysis will support decisions for a variety of planned ecosystem management actions within watersheds. Specific actions may include habitat restoration, sediment reduction programs, road removal and management, timber harvesting, development of a recreation facility, or any of a multitude of activities. Monitoring will be an essential component of these management actions and will be guided by the results of watershed analysis.

General objectives of monitoring will be to: (1) determine if Best Management Practices have been implemented, (2) determine the effectiveness of management practices at multiple scales, ranging from individual sites to watersheds, and (3) validate whether ecosystem functions and processes have been maintained as predicted. In addition, monitoring will provide feedback to fuel the adaptive management process.

Specific monitoring objectives will be derived from results of the watershed analysis and tailored to each watershed. Monitoring at the 20 to 200 square mile watershed level will link monitoring for ecosystem management objectives for multiple scales of province, river basin, smaller watershed and site-specific levels. Specific locations of unstable and potentially unstable areas, roads, and harvest activities will be identified. In addition, the spatial relationship of potentially unstable areas and management actions to sensitive habitats such as wetlands will be determined. This information provides a basis for targeting watershed monitoring activities to assess outcomes associated with risks and uncertainties identified during watershed analyses.

Under natural conditions, river and stream habitats on federal forest lands exhibit an extremely wide diversity of conditions depending on past disturbances, topography, geomorphology, climate end other factors. Consequently, riparian area monitoring must be dispersed among the various landscapes rather than concentrated at a few sites and then extrapolated to the entire forest. Logistical and financial constraints require a stratified monitoring program that includes:

- Post-project site review
- Reference to subdrainages
- Basin monitoring
- A water quality network
- Landscape integration of monitoring data

A stratified monitoring program examines watersheds at several spatial and temporal scales. Information is provided on hillslope, floodplain, and channel functions, water quality, fish and wildlife habitat and populations, and vegetation diversity and dynamics.

Parameters selected for monitoring depend on the activities planned for a given watershed designed to specifically address forest practices and associated activities such as road construction and maintenance. Two of the more extensive activities related to water quality are timber harvest and road related operations. Other activities such as mining and in-stream channel alterations to improve habitat can affect water quality in localized areas. In addition to chemical and physical parameters, biological criteria may be appropriate to monitor using techniques such as Rapid Bioassessment Protocols for macroinvertebrates or the index of biotic integrity for fish diversity.

Long-term systematic monitoring in selected watersheds will be necessary to provide reference points for effectiveness and validation monitoring. These watersheds should represent a range of forest and stream conditions that have been exposed to natural and induced disturbance. Reference watersheds, subbasins, and individual sites will be selected as part of the overall adaptive management process described as part of these standards and guidelines.

Study plans will be cooperatively developed based on province, river basin, and/or watershed level analyses. Long-term data sets from reference watersheds will provide an essential basis for adaptive management and a gauge by which to assess trends in in-stream condition.

Monitoring plans must be tailored for each watershed. Significant differences in type and intensity of monitoring will occur based on watershed characteristics and management actions. For example, carefully targeted restoration activities may only require effectiveness monitoring of single activities, whereas watershed-scale restoration would be accompanied by extensive

riparian and in-stream monitoring. The specific design of monitoring program can best be accomplished by the local interdisciplinary teams working in cooperation with state programs. Pooling the monitoring resources of federal and state agencies is a necessity to provide interagency consistency and to increase available resources.

Monitoring will be conducted and results will be documented, analyzed and reported by the agency or agencies responsible for land management in any particular watershed. Reports will be reviewed by local interdisciplinary teams. In addition, water resource regulatory agencies may review results to determine compliance with appropriate standards, and province and river basin-level strategies. A cross-section of team members that includes participants from states and regulatory agencies should assess monitoring results and recommend changes in Best Management Practices or the mechanisms for Best Management Practice implementation.

# Riparian Reserves

## Acres

Key and non-Key Watersheds are specified for all areas, and therefore overlay all other land allocations. For the portion of Riparian Reserves located within Key Watersheds, standards and guidelines for Key Watersheds (see Key Watersheds on page C-7, and the Aquatic Conservation Strategy starting on page B-9 of these standards and guidelines), as well as standards and guidelines for Riparian Reserves (listed below) apply. See additional detail under Hierarchy of Standards and Guidelines on page C-1 of these standards and guidelines.

| | |
|---|---|
| Riparian Reserves within Tier 1 Key Watersheds | 631,000 |
| Riparian Reserves within Tier 2 Key Watersheds | 113,700 |
| Riparian Reserves within non-Key (other) Watersheds | 1,882,800 |
| Total Riparian Reserve acres (based on samples) | 2,627,500 |

Acreage of Riparian Reserves is calculated after all other designated areas have been calculated. Thus, the acres shown here are only those acres that are interspersed with matrix. However, Riparian Reserve standards and guidelines apply in the other designated area categories.

## Description - Riparian Reserve Widths

Riparian Reserves, as described in detail in the Aquatic Conservation Strategy starting on page B-9 of these standards and guidelines, are specified for five categories of streams or waterbodies as follows:

- *Fish-bearing streams* - Riparian Reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

- *Permanently flowing nonfish-bearing streams* - Riparian Reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to

the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

- *Constructed ponds and reservoirs, and wetlands greater than 1 acre* - Riparian Reserves consist of the body of water or wetland and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.

- *Lakes and natural ponds* - Riparian Reserves consist of the body of water and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.

- *Seasonally flowing or intermittent streams, wetlands less than I acre, and unstable and potentially unstable areas* - This category applies to features with high variability in size and site-specific characteristics. At a minimum, the Riparian Reserves must include:

  The extent of unstable and potentially unstable areas (including earthflows),

  The stream channel and extend to the top of the inner gorge,

  The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation, and

  Extension from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest.

A site-potential tree height is the average maximum height of the tallest dominant trees (200 years or older) for a given site class.

Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria.

## Standards and Guidelines

Also see Standards and Guidelines Common to all Land Allocations starting on page C-2 of these standards and guidelines.

As a general rule, standards and guidelines for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives. Watershed analysis and appropriate NEPA compliance is required to change Riparian Reserve boundaries in all watersheds.

**Timber Management**

TM-1. Prohibit timber harvest, including fuelwood cutting, in Riparian Reserves, except as described below. Riparian Reserve acres shall not be included in calculations of the timber base.

# Appendix E
# Washington Department of Fish and Wildlife Mitigation Policy

**Department of Fish and Wildlife POL-M5002**

**POLICY TITLE: Requiring or Recommending Mitigation**

Replaces:
See Also:WDW POL 3000, 3001 and 3002,
all dated 10/1/92; WDW POL 3003,
dated 9/16/92; WDF Policy 410,
dated 9/10/90; and WDF Policy 404,
dated 5/1/87
Commission Policies

## POL-M5002 REQUIRING OR RECOMMENDING MITIGATION

This policy applies to all habitat protection assignments where the Washington Department of Fish and Wildlife (WDFW) is issuing or commenting on environmental protection permits, documents, or violation settlements; or when seeking commensurate compensation for impacts to fish and wildlife resources resulting from oil or other toxic spills.

1. Goal is to achieve no loss of habitat functions and values.
The goal of WDFW is to maintain the functions and values of fish and wildlife habitat in the state. We strive to protect the productive capacity and opportunities reasonably expected of a site in the future. In the long-term, WDFW shall seek a net gain in productive capacity of habitat through restoration, creation, and enhancement. Mitigation credits and debits shall be based on a scientifically valid measure of habitat function, value, and area. Ratios shall be greater than 1:1 to compensate for temporal losses, uncertainty of performance, and differences in functions and values.

2. WDFW uses the following definition of mitigation; avoiding impacts is the highest mitigation priority.
"Mitigation" means actions that shall be required or recommended to avoid or compensate for impacts to fish, wildlife, or habitat from the proposed project activity. The type(s) of mitigation required shall be considered and implemented, where feasible, in the following sequential order of preference:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.
- Monitoring the impact and taking appropriate corrective measures to achieve the identified goal.

3. WDFW requires mitigation when issuing environmental permits or documents.

4. WDFW recommends mitigation on permits or documents issued by other agencies.

5. Complete mitigation ensures no loss of habitat functions or values, or populations.
Complete mitigation is achieved when mitigation elements in number 2 (A-F) ensures no loss of habitat functions or values, or fish and wildlife populations. Habitat loss and mitigation success shall be measured with the Habitat Evaluation Procedure (HEP) or other method acceptable to WDFW.

6. On-site in-kind mitigation is the highest priority.
WDFW priorities for mitigation location and type, in the following sequential order of preference, are:
On-site, in-kind.
Off-site, in-kind.
On-site, out-of-kind.
Off-site, out-of-kind.
For off-site mitigation to be accepted, the project proponent must demonstrate to WDFW's satisfaction that greater habitat function and value can be achieved off-site than on-site.
Combination of the four types may be accepted. "On-site" means on or adjacent to the project impact site. "In-kind" means the same species or habitat that was impacted.
Out-of-kind mitigation is not acceptable for impacts to priority habitats and species, with two exceptions: (1) priority habitats and species that are at greater risk can be substituted for impacted priority habitats and species; and (2) for hydraulic projects, WDFW shall consider off-site and/or out-of-kind mitigation where equal or better biological functions and values are provided (see number 8 below). Priority habitats, and habitats of priority species, may be replaced at a level greater than the impacts of the project on those habitats and species.

7. For off-site fish mitigation, mitigation must occur in the same Water Resource Inventory Area (WRIA) as the impacts.
Exceptions to the above must be approved by the director.
For federal endangered or threatened species, mitigation must occur within the habitat supporting the same Evolutionary Significant Unit (ESU).

8. WDFW may not limit mitigation to on-site, in-kind mitigation when making decisions on hydraulic project approvals for infrastructure development projects.
The State Legislature has declared that it is the policy of the state to authorize innovative mitigation measures by requiring state regulatory agencies to consider mitigation proposals for infrastructure projects that are timed, designed, and located in a

manner to provide equal or better biological functions and values compared to traditional on-site, in-kind mitigation proposals. For these types of projects, WDFW may not limit the scope of options in a mitigation plan to areas on or near the project site, or to habitat types of the same type as contained on a project site. When making a permit decision, WDFW shall consider whether the mitigation plan provides equal or better biological functions and values, compared to the existing conditions, for the target resources or species identified in the mitigation plan. The factors WDFW must consider in making this decision are identified in RCW 90.74.020 (3). Also see RCW 75.20.098 and Chapter 90.74 RCW.

9. When WDFW is issuing a Hydraulic Project Approval in relation to state or federal cleanup sites, and WDFW is the sole decision-maker, WDFW can only require mitigation if the sediment dredging or capping actions do not result in a cleaner aquatic environment and equal or better habitat functions and values.
When other agencies are decision-makers, recommendations for mitigation may be made under other state or federal authority to protect habitat functions and values.

10. When WDFW is issuing a Hydraulic Project Approval and is the sole decision-maker, WDFW can request, but cannot require "habitat mitigation" for maintenance dredging of existing navigable channels and berthing areas.
The phrase, "habitat mitigation" is analogous to compensatory mitigation. See RCW 75.20.325. When other agencies are decision-makers, recommendations for mitigation may be made under other state or federal authority to protect habitat functions and values.

11. Preserving at-risk, high quality priority habitat may be considered as part of an acceptable mitigation plan.
When high quality areas of priority habitats or habitats of priority species are at risk, preservation of those habitats may be accepted as part of a mitigation plan, as long as there is no loss of habitat function.

12. Habitat replacement is preferred to hatcheries for fish mitigation.
Commission policy directs WDFW to give priority to natural production rather than hatchery production, within habitat capabilities.

13. Mitigation game fish may be purchased from aquatic farmers.
If WDFW requires, as part of a mitigation agreement, that resident hatchery game fish be stocked, RCW 77.18.020 requires that WDFW notify the project proponent that the fish may be purchased from a private aquatic farmer. WDFW shall specify fish health requirements,

pounds or numbers, species, stock, and/or race of the fish to be provided.

14. Where authority exists, strive to maintain recreational and harvest opportunities.

15. Approved habitat mitigation measures shall be based on best available science.

16. Mitigation plans shall be required for a project with significant impacts. Mitigation plans shall include the following:.

- Baseline data
- Estimate of impacts
- Mitigation measures
- Goals and objectives
- Detailed implementation plan
- Adequate replacement ratio
- Performance standards to measure whether goals are being reached
- Maps and drawings of proposal
- As-built drawings
- Operation and maintenance plans (including who will perform)
- Monitoring and evaluation plans (including schedules)

- Contingency plans, including corrective actions that will be taken if mitigation developments do not meet goals and objectives
- Any agreements on performance bonds or other guarantees that the proponent will fulfill mitigation, operation and maintenance, monitoring, and contingency plan.

17. Proven mitigation techniques must be used.
Experimental mitigation techniques are allowable only if advance mitigation is being performed and will be fully functional prior to the project impacts.

18. Mitigation shall proceed along with project construction.
Mitigation measures are an integral part of a construction project and shall be completed before or during project construction, except projects with impacts that have no proven mitigation techniques. Those projects require advance mitigation.

19. Delayed mitigation shall include replacement that is greater than losses.
Mitigation that is implemented after project construction, or that requires a long time to reach replacement value, shall include additional habitat value (over and above replacement value) equal to the loss through time.

20. WDFW shall determine impacts and mitigation.
WDFW shall determine the project impact, significance of impact, amount of mitigation required, and amount of mitigation achieved, based on the best available information, including the applicant's

plans and specifications.
For large projects with potentially significant impacts, this will be based on review of studies approved by WDFW.

21. Cumulative impacts of projects shall be considered.
Cumulative impacts of projects shall be considered and appropriate measures taken to avoid or minimize those impacts.

22. Project proponent pays mitigation costs.
Mitigation costs may include but are not limited to:
- Studies to determine impacts and mitigation needs.
- Alteration of project design.
- Planning, design, and construction of mitigation features.
- Operation and maintenance of mitigation measures for duration of project (including personnel).
- Monitoring of mitigation measures and fish and wildlife response.
- All WDFW costs including engineering analysis and input.

23. Performance bond or other monetary assurance may be accepted.
A performance bond, letter of credit, escrow account, or other written financial guarantee may be accepted to ensure that the project proponent will fulfill mitigation requirements, operation and maintenance, monitoring, and contingency plans. The amount of the bond should cover the costs plus 10 percent.

24. Mitigation site shall be protected for the life of the project.
The mitigation site shall be protected permanently, or at a minimum, for the life of the project. This protection shall be through conservation easement, deed restriction, donation to WDFW, or other legally binding method.

25. WDFW shall seek mitigation for unmitigated projects.
WDFW shall seek mitigation for unmitigated or undermitigated existing projects. Criteria for prioritizing unmitigated projects are:
- Fish and wildlife losses from the project.
- Potential gains of fish and wildlife.
- Likelihood of achieving mitigation.
- Time required to achieve mitigation.
- Support from other agencies and tribes.
- Presence of priority habitats and species.
- Cost to WDFW.

26. Compliance monitoring shall be performed as funding allows.

27. Mitigation banking may be an acceptable form of mitigation.
The term "mitigation bank" as used here refers to a habitat creation, restoration, or enhancement project undertaken by a project proponent to act as a bank of credits to compensate for

habitat impacts from future development projects. Credits and debits shall be based on area or a scientifically valid measure of habitat function and value acceptable to WDFW, such as the Habitat Evaluation Procedure (HEP). The use of credits from a mitigation bank as a form of compensation shall occur only after the standard sequencing of mitigation negotiations (avoid, minimize, rectify, reduce, and then compensate). Habitat units may be traded or sold.

28. Terms of mitigation must be documented.
A mitigation contract is necessary to document the terms of the mitigation. Mitigation contracts may take several forms:

- Mitigation agreement (must be approved by Office of Attorney General).
- Federal Energy Regulatory Commission (FERC) order.
- Conditions on an environmental permit.
- Statements in a final environmental impact statement.
- Conservation easement.
- Energy Facility Site Evaluation Council (EFSEC) site certification.
- Landowner Landscape Plan.

29. Habitat and Lands Services Program coordinates all mitigation projects except Columbia and Snake River mainstem fish mitigation projects that are coordinated by the Intergovernmental Fisheries Program.
The program that coordinates the mitigation projects is responsible for coordinating with all other programs and regions that have interest or involvement in the project.

30. Facilities shall be transferred to the appropriate program for management.
When mitigation planning is completed, responsibility for any facilities (land, fish cultural facility, etc.) shall be transferred to the appropriate program and region. During the latter stages of planning, the managing program shall be phased into the process.

31. Managing programs shall follow the mitigation contract.
The program and region managing a mitigation facility or project shall follow the terms of the mitigation contract at all times. No deviations shall be made from the mitigation contract unless approved by the program that negotiated the contract.